The Builder.

Vol. XLI. No. 2076. Saturday, September 24 1881.

ILLUSTRATIONS.

Oban-street Board School, Tower Hamlets.—Mr. Edward Robert Robson, F.S.A., Architect 390
Section and Plans of Oban street Board School 392, 394
High School for Girls, Dover-street, Manchester.—Messrs. Mills & Murgatroyd, Architects 395
Designs for Date Tablets.—By Geo. Chas. Haite 397
A Street in Rothenburg, Germany 399

CONTENTS.

The Word "Nature" in Reference to Art 379
A Tidal Port for London 380
Some Aspects of the Trade Unions Congress 381
The Commercial Value of Art 382
The Memorial Window to Mary Tudor 382
The Dust hole 383
The "Livadia" at her last Moorings 383
Building and Engineering Congress in Dantzic 384
Keighley and its Trade 385
English and Italian Art Workmen 385
Castles of the Early English Period 386
Entrenchment of the Yorkshire Wolds 388
New Board School, Oban-street, Tower Hamlets 388
High School for Girls, Dover-street, Manchester 388
Designs for Date Tablets 388
A Street in Rothenburg, Germany 399
Sanitary Progress 401
The New Infirmary at Bolton 401
The Patent Laws: the Society of Arts' Patent Bill 402
The Savoy Theatre 402
Public Works at Ipswich 403
A Seaside Reflection 404
On the Pressure of Wind upon a Fixed Plane Surface 404
The Liverpool University College and the Corporation 404
The Liverpool Building and Sanitary Acts 405
The New Eddystone Lighthouse 405
Development of Water-power in the United States 405
Construction of Public Libraries 405
Electricity as a Motive Power 405
Railway Cottage Building 406
Machine-made Lace 406
Patent Record 406
Church Decoration 406
London Front Gardens 406
Lincoln's Inn Chapel 407
Vergers and Cathedrals 407
The Churches and Towns of Buckinghamshire 407
Fire and Water 407
Ownership of Bills of Quantities 407
School-Board Schools 407
Middle class Education 408
Miscellanea 408

The Word "Nature" in Reference to Art.

CORRESPONDENT recently drew attention in our columns, not without reason, to the confusion of thought arising from the varying senses in which the word "nature" was used in art-criticism. Another correspondent, Mr. J. K. Colling, in a letter printed in a previous number, took some exception to our criticism of his introduction to a book on design, in which we suggested that he had pushed too far the statement that all ornament must be founded on geometrical forms. In his letter Mr. Colling said that such forms were based upon nature, and that "all mathematics and geometry are closely allied to laws which exist in nature."

It was to this sentence especially that our second correspondent, Mr. Cave Thomas, took exception, and thereupon demanded that people should settle what they mean by "nature" when they refer to it as the basis of art. Without going so far as to say that no discussion on any artistic topic is of any value until people have settled what they mean by "nature," we must at least say that the word has been used with great laxity and vagueness as to its meaning, and that our correspondent did usefully in calling attention to the point, even though, as it appears to us, he showed that he himself was under a certain confusion, if not of perception, at least of expression, in regard to it, though by no means so much so as the first correspondent whose expression he criticised. To say that mathematics and geometry "are closely allied to laws which exist in nature," is, in fact, a most extraordinary confusion of terms; Mr. Colling may pardon us for saying so, since it has been his business to express himself with the pencil rather than with the pen, and we do not take his laxity of literary expression as in any way invalidating the value of his artistic taste, feeling, and draughtsmanship. Taking the word "nature" in the widest sense, mathematical and geometrical facts are not merely "allied to" nature, they are the expressions of laws which exist in nature. But Mr. Colling did not mean to use the word "nature" in its widest sense. What his sentence evidently meant, if it had been less vaguely expressed, was that the relations between lines and surfaces which exist in geometry and are demonstrable by mathematics, are frequently illustrated in the facts of external nature; the word "nature" being here used as expressing the aggregate of the external forms of nature, organic and inorganic.

The confusion of idea, and it is one which we admit is constantly recurring, is between outward forms of natural production, and what are regarded as principles or laws governing everything in nature, and among other things governing, more or less, the formation of vegetable growths, which are the basis of a large proportion of ornamental design. In fact, if we closely examine the point, we shall see that the one word "nature" is used in three different meanings when nature is spoken of as the basis of art. We may say that the disposition of lines and spaces is pleasing in proportion as they adhere to certain geometrical forms which have their basis in natural law. That is one use of the term, and that refers entirely to abstract laws which are capable of demonstration by pure theory and apart from any artistic representation at all. We may say, again, it is a law of nature that trees and plants should give forth branches at nearly regular intervals and at different sides of the central stem in succession; that is a fact referring to the mechanism of the plant, and also capable of statement without artistic illustration, but it is not, like the previous class, a law affecting all our conceptions of spaces and proportions in whatever material; it is a fact habitual to a certain class of natural growths. Then the third sense is when we see a drawing, say of a leaf, supposed to represent a specified leaf in nature, and we say "that is not correct, not according to nature, the natural shape is this," and then comes in the aid of the pencil, without which in this case we cannot make ourselves intelligible. This third use of the word refers to isolated facts and forms in nature, which we are supposed to be imitating, so that here the connexion between "nature" and "art" is the most obvious and immediate of all.

Now it is hardly possible in this case to settle what we mean by "nature," that is, to attach the word to one only of those meanings, unless we are willing to leave the other meanings without a word to express them, or else to agree to the use of some modifying expression which will indicate in what sense we mean to refer to nature. Now it appears to us that this modifying expression may be supplied by two words, one of which has got a rather bad name through being constantly used in reference to what are supposed to be vague and dreamy speculations; but which are in reality perfectly logical and intelligible expressions, calculated, when rightly used, to save a great many words and a great deal of misunderstanding (we mean "misunderstanding" in the direct, not in the secondary sense). These are the expressions "physical" and "metaphysical," of which the former of course is nearly the Greek equivalent of "natural," — entirely the equivalent in its accepted meaning; and the latter is one of those convenient combinations which the pliant Greek language was so well able to frame to express a complicated meaning in one word. If we were to invent a corresponding expression to go with our word "nature," we should say that "natural" and "sub-natural" would be the equivalents; but we do not think that good fortune attends upon attempts deliberately made to invent new words. Going back to the old Greek compounds, therefore, which have long been adopted into our language, we know that the simple word "φύσις" is the equivalent of "nature," external nature, the garment of the world; physical is "natural," physical facts are facts in nature, physical laws are laws of nature, —outward visible nature, be it observed. Then that which is metaphysical is—what? That which is behind nature, that which we come to when we endeavour to penetrate below the physical facts to any laws or what we may call in one sense facts which are not physical, but are capable of demonstration quite apart from external nature. To give one illustration, it is a physical fact that bees make their cells hexagon shape; it is a metaphysical fact that the hexagon shape allows of contact on all sides without any loss of space; *meta*physical, because that property or capability of hexagons would be the same in any material and under any circumstances, and would equally exist if all external nature were swept away, and would be capable of demonstration in figures without any reference to external nature at all.

Let us see how this applies to the subject in hand. It is asserted by the advocates of symmetrical and geometrical arrangement in ornamental design, that such arrangement largely, if not entirely, pervades "nature," by which term some of them mean apparently that geometrical symmetry is based on natural laws, and that, therefore, geometrical ornament is "founded on nature"; others assert that a minute inspection of nature will reveal a constant or almost universal presence of geometrical and symmetrical forms. Among the upholders of this latter view was Owen Jones, who, to our thinking, greatly overstated his position. Nor can we accept Mr. Cave Thomas's way of putting it in his letter in the *Builder* of the 3rd inst., that "regularity and irregularity are two extremes, between which nature, art included, is always striving to steer a middle course." That is a very empirical way of stating the case. Our belief is that all symmetry in the organic forms of nature is mechanical in its origin; that it occurs or originates at least where there is some advantage to the organism to be gained by it. Take the spiral growth of trees and plants, which put out their shoots at opposite sides alternately. A tree which put out all its branches at one side would be under the double disadvantage of being liable to be pulled over on that side by its weight, and of breathing the air from one quarter only instead of from all sides. Animals are bi-symmetrical because this formation is necessary to their balance and to the alternate

movement required for progression, and in their case a considerable exactitude of symmetrical arrangement is necessary to their comfortable existence. Leaves are bi-symmetrical mostly, apparently, because this is the best way of securing equal radiation of sap from the central stalk; but their symmetry has much more latitude than in the case of animals, as has that of the whole plant also, in the great majority of species. Anything like absolutely geometrical symmetry is, in fact, the exception in the forms of the vegetable kingdom, and in the animal kingdom even is only to be found in the main disposition, not in the details. The hands are symmetrically disposed; but the hand itself is quite unsymmetrical. Almost the only instances of absolute geometrical symmetry in nature are in some inorganic products, such as snow crystals, and these are in quite a different category. These do not, as far as we understand them, arise from any such "survival of the fittest," as that which we may suppose to have developed the symmetrical growth of plants on either side of a centre; they are simply the results of all-pervading laws of arrangement and balance of matter, acting upon very impressible and fragile materials, and kneading them into shapes accordingly. They are the effect of a law of nature, in the same sense that the circular ripples from the splash of a stone in water are the effect of a law, with the difference that the latter effect, in a fluid material, is evanescent; the former is durable.

Those, then, who defend symmetry in ornament on the ground of the existence of symmetry in physical organic forms, rest on a false footing. Such symmetry as we exhibit in designing symmetrical ornament has very little existence in nature. The true meaning of symmetrical ornament, exhibiting or founded on natural forms, more or less conventionalised, is that, in designing it, we take details from physical forms, and combine them in subordination to broader metaphysical laws, or perhaps only to a broader and more typical reading of the physical law. The physical law that plants should sprout on alternate sides of the stem, for example, may be generalised into a form representing the completely symmetrical giving off of lines on either side of a centre, expressing the general idea of the plant growth, although the same mathematical symmetry would not be found in any individual plant. In this case, from the physical fact, we generalise metaphysically to an artistic expression of the principle.

When we come, therefore, to the question whether ornament ought to be symmetrical or not, it is not so much a question of what is according to nature or not, as of the way in which you choose to use nature, and the view which you take as to the object of your design. Taking the question which gave rise to the letters that suggested these remarks, as to how far we should recognise or approve the unsymmetrical ornament of the Japanese, we have no hesitation in saying that much of the more symmetrical ornament of Classic, Arabian, and Mediæval times, is a higher stamp of work, because more thought goes to the production of it, —that it is a treatment of forms based on physical facts in accordance with the application of metaphysical laws or ideas; whereas the Japanese is simply the imitation of the natural facts without the application to their treatment of any higher law. We suspect the fact is that to the Japanese artist, what we call his ornamental design is not, in his mind, ornament at all, in the sense in which we use the word, but painting from nature; an art which, it is needless to say, stands on quite a different ground from ornamental design. In some other forms of ornamental design, which have by one writer been called "abstract ornament," such as the Greek fret, and the Arabic interlacing patterns, the basis of the design is purely metaphysical, that is, it is a kind of playing with geometrical laws and proportions, which are quite apart from external nature, and weaving a kind of physical growth of our own designing on the basis of them. Just as there are three ways of regarding nature as the basis of ornamental design, so there may be said to be three methods of producing ornamental design; that in which we follow laws of pure geometric proportion, and illustrate them in a more or less playful way; that in which we adopt physical forms, but subject them to metaphysical laws in grouping and arrangement; and that in which we simply reproduce physical forms. Of this latter, of which, of course, the greater part of Japanese ornament is an illustration, it is an open question, strictly speaking, whether it ought to be called ornament at all, and whether it was ever intended so, in one sense, by its producers: but it is at present called so.

When, therefore, to conclude, any one raises the question whether ornament should be an imitation of nature or not, or whether such-and-such features in it are in accordance with nature or not, what we have to do, before it is any use arguing further with him, is to elicit from him whether he means according to *metaphysical laws* of nature, or *physical laws*, or *physical facts*. That is the essence of the question he has to answer. If any one can suggest a better nomenclature to put it in we shall be very glad to hear it.

A TIDAL PORT FOR LONDON.

IT was a not unusual remark, some thirty or forty years ago, that the Thames was the finest dock in England. Indeed, a strong, if blind, patriotism often went so far as to call it the finest dock in the world. The remark showed, indeed, that the man who made it had never seen Milford Haven, Falmouth, or Cork Harbour. But the fact that the shelter and facility which the Thames affords for shipping have been the making of London is beyond doubt. And if the words "the most frequented port" were substituted for those which we have quoted, there could be no ground to quarrel with their exactitude.

With the immense growth of the steam navy of the world, a growth not only in the numbers but in the size of the vessels, the disadvantages of berthing in a tide way, instead of steaming into a tidal dock, are becoming year by year more apparent. And, notwithstanding the growth of those noble docks that already line the banks of the Thames, there is still much to be desired in the way of providing a port into which vessels may enter, and from which they may depart, at any hour of the day, or at all events at each flood tide. Even the most capacious of the docks now existing alongside of the Thames are inadequate for the reception of the largest steamers now afloat. There is no dock, it is stated, into which the *Orient*, the *City of Rome*, or other steamers of the same class, can at present enter. And even vessels of somewhat less draught cannot be docked in a single tide; as by the time the ship comes up from the sea in the twelve hours for which the tide serves, the water has sunk to too low a level to float the vessel over the cill of the dock. Thus twelve or even twenty-four hours are lost, as great ships invariably anchor off Gravesend for twelve hours to await the following tide.

On entering the river Thames, the broad open channel called Sea Reach runs for ten miles nearly due west, after passing Yantlet Creek. It then bends to the south, the bend forming Lower Hope Reach, which is about four miles long, or from three to three and a half in the fair way of the channel; and then again runs westward for about five miles, through Gravesend Reach. About the middle of this reach lies the town of Gravesend on the south, and Tilbury Fort on the north of the river. It is here that the principal ocean-carrying companies now for the most part embark and disembark their passengers, communication with London being kept up by the North Kent Railway on the right bank of the river, and by the London, Tilbury, and Southend Railway on the left bank. From Yantlet Creek to London Bridge is forty-one miles by the river; and it is forty-eight miles from the Great Nore, below the junction of the Medway, to the Bridge. Gravesend is by river twenty-seven miles from London Bridge, through which distance the course of the river is tortuous, with lessening depth and narrowing width. And such is the peculiar character of the river, and such the force of the winds, tides, and currents, that low water in London is sometimes actually lower than low water at Sheerness. On the 24th December, 1877, it is stated by Mr. Redman, C.E., to whom the Thames has long been a subject of attentive study, the low water at London was 4 ft. 4 in. lower than at Sheerness. The depth of water between Tilbury and Gravesend is from 40 ft. to 50 ft. at low water. The range of the tide is from 16 ft. 10 in. to 17 ft. 6 in. at Sheerness, and from 20 ft. to 22 ft. at London.

The directors of the East and West India Docks have now purchased an area of 450 acres on the left bank of the river Thames at Tilbury End, opposite Gravesend, with the purpose of there constructing great docks, capable of receiving the largest vessels now built at any time of the tide. A tidal basin of sixteen acres in extent, and 40 ft. deep, will open by an entrance 200 ft. wide into the river. From this basin access will be given to the docks by a lock of 700 ft. long, with a depth of 40 ft. water on the cill. The floating docks are to have a quayage of 15,000 ft., allowing working berths to thirty steamers of 400 ft. each in length. There is to be a dry dock of 825 ft. in length, as well as others of less colossal proportions. All modern appliances (in which the Americans are probably far ahead of ourselves), in the way of elevators, coaling lifts, and the like, will be provided, with hydraulic power, such as we recently mentioned as applied to the new docks at Liverpool. Landing stages will be provided for the embarkation and disembarkation of passengers at any time of the tide. Pilotage, tugging, risk of fogs, risk of collisions, delay in warping up twenty miles of winding channel, will all be avoided by this opening of a new front door for the maritime commerce of London.

The one point which strikes us with wonder on comparing the outline of this project with the chart of the River Thames is,—"How is it that this scheme has not long ago been taken in hand?" Floating or wet docks were first introduced at Liverpool about the year 1716. They have since that time been introduced into almost all the principal ports of the kingdom. In the Thames the East and West India Docks were constructed by Jessop, Rennie, and Ralph Walker; the London Docks, by Rennie; the St. Katharine's Docks, by Telford. Much has been spent in providing the accommodation that now exists. Mr. Robert Stephenson and Mr. Bidder, when they commenced, almost at their own risk, the railway to Tilbury, must have had some not indistinct idea of the manner in which railway communication would react upon river communication, as regards the position of a sea-going station. The whole line of river shore from Stanford-le-Marsh to Coal House Point, and thence to Tilburyness, seems as if it had been especially provided by nature for the construction of floating docks. From any part of London it may be made as easy to get to Tilbury as it is now to get to Blackwall. The addition of some sixteen miles to the railway journey is as nothing when compared to the saving of from twelve to twenty-four hours in clearing the Thames after embarkation, and when we regard what is even more important than gain of time, namely, certain punctuality of departure, and, to an increased extent as compared with previous conditions, punctuality in arrival. The estimate which is mentioned of 1,100,000*l.* seems to us very inadequate to such an enterprise as is now foreshadowed, especially when we recall the sums expended on the docks at Liverpool. We trust that no false idea of economy may be allowed to mar the execution of a scheme which we take to be one of the most important, as well as one of the most promising, of which we have recently heard.

In saying this, however, we confine ourselves to the approval of the principle of the design, as far as concerns the construction of docks at Tilbury. As to the details, we are as yet unaware of more than we have previously stated. We should not feel called on even to make this reservation were it not for what seems to us the small sum named as the cost. Of course, if land enough be in the first place secured, it is possible to commence on a portion of a well-designed plan, which may be afterwards enlarged from time to time. And if we compare such few details as those given us with those which we published last week with regard to the new Alexandra Dock at Liverpool, it would seem as if the engineer of the Tilbury Docks was resolved that the Mersey shall not continue to beat the Thames in the facilities which it offers for commerce. The *avant-port*, or tidal basin, in the Liverpool system, has an area of 7 acres; that at Tilbury is to have 14 acres of water-surface. The depth of the former is to be 44 ft. at high-water; that of the latter, 40 ft. at low-water. The entrance of the Liverpool basin is 400 ft. wide, as compared with one of 200 ft. in the Thames. This, however, is a matter for the hydrographer to determine. The most appropriate width is a question that depends on many conditions, on position with reference to the river, on direction of winds, tides, and currents, and the like. The Mersey is a far more difficult river to enter

safely than the Thames, and we see no reason to doubt that a proper width for the entrance of the *avant-port* has been adopted in each case.

From a tidal basin the entrance into a system of docks is practicable in more ways than one. The point which the engineer has to keep in view is how to obtain the greatest length of berthage or quay wall with a given floating area, due provision being made for the passage of any vessel to or from its berth at any time without interfering with any other vessel. This problem, when neatly put, is not one of extraordinary difficulty. In the Liverpool case there is an approach to its solution by what we may call a gridiron arrangement,—that is to say, by the construction of branch docks at right angles to the main dock. This arrangement possesses the advantage of greater concentration. The length of quay wall and of accompanying railway will be much the same, however it is disposed. But to go from a vessel in one dock to one in another will generally be far more easy when docks are arranged in parallel lines than when one great line of quay extends for a long distance. That, however, is a matter of detail. There is land enough at Tilbury, water enough in the Thames at that spot, money enough, and engineering skill enough, at the disposal of the great dock company. We do not doubt that the new Thames port will be a credit to its promoters and a great benefit to the trade of London.

SOME ASPECTS OF THE TRADE UNIONS CONGRESS.

THE first Congress of the Trade Unions held in London took place, as every one now knows, last week, and has naturally excited a good deal of public interest, even on the part of those who have no special reason for following with interest the progress and ideas of those who are called the working classes. The contrast between the position now held by Trade Unionism in public importance and in public estimation, and the cloud of indignation under which the movement first struggled into existence, is certainly very remarkable. So far has the movement been able to mould public opinion, that one journal, in commenting upon its present aspect, observed that to revive old stories of trade-union outrages would now seem as unjust and inappropriate as to remind people of the barbarous practices of their ancestors. There certainly is a remarkable elevation of tone observable in the actions and utterances of the trades unions,—or, as we prefer to phrase it, "trade unions,"—within a remarkably short space of time; though, recalling one or two of the flagrant instances of narrowmindedness and injustice to employers which we had occasion to comment very strongly upon not so very long since, we are hardly prepared to see things quite so favourably in this respect as our contemporary seemed able to see them. Still, we fully believe that the idea of violent measures, such as amount to what the French call *voies de fait*, is quite discountenanced by all who take a leading part in the action of trade unions at the present moment.

The ugly facts which characterised the birth of trade unionism were, indeed, attributable to the same kind of causes as those which have often led to cruelties and violence being committed in connexion with the assertion of liberty. The working-men in the principal trades had long been at the mercy of the capitalists, and had been treated in a great number of cases with a most arbitrary indifference to the good of any one but the capitalist, under whose power they practically lay; for if one workman or shopful of men refused the terms of the capitalist, he could always count on getting others who would accept them, and to be the first to rebel was to commit suicide. The movement in the direction of combination as a means of organised resistance to this oppression by capital arose therefore out of bitter feelings of revolt against injustice and oppression, and exhibited naturally the violence which might be expected when a body of men, including among their numbers not a few ill-educated and morose spirits, found themselves in possession of a new and formidable weapon with which to repay their former masters in kind. While holding still the opinion that much of the early history of trade unionism, in some quarters of England more especially, was marked by proceedings that were perfectly disgraceful, and concerning which there ought to be no two opinions, we entirely concur in the feeling that this unhappy phase of the movement should now no more be recalled on the one hand than it should be justified on the other. Whatever faults or shortcomings the trade unionism of to-day may have, whatever mistakes it may make, it is thoroughly respectable and respected, and appears desirous not only to do what is right, but even to appear as the promulgator of social theories and aims in advance of the average social morality of the day.

In this latter respect, however, we must be allowed to suggest that the attitude and tone of the trade unions, as represented at this recent Congress, are a little too magnificent. Putting together a number of expressions and sentiments which were uttered by various speakers, it would really seem as if the trade unions considered themselves as the salt of the earth, and as the only body of people in the country who were actuated by the loftiest and purest political and social motives. This tone of what may be called corporate self-congratulation on all the good that "we" have done and intend to do runs through the whole of the proceedings, from the condemnation of the whole bench of magistrates, paid and unpaid, and the suggestions for their wholesale amelioration, down to the superb tone of injured virtue in which some delegates supposed to represent Protectionist or "Fair-trade" interests were alluded to as those who had come there to do "the dirty despicable work of those who were opposed to the interests of trade unions," and "to bring disgrace upon the trade unions of the country," apparently by holding and expressing opinions about trade different from those held by the Congress. The obnoxious delegates, or some of them, appear to have been technically in the wrong as to their standing-ground in the Congress; but, beyond this, we do not gather that they evinced any crime except that of being Protectionists; and though we believe the revival of the Protection idea to be in the main a mistake, the matter is not by any means so simple a one as the trade unions appear to think, and it might in any case have been useful, if such questions are to be discussed by trade unions, to listen to what those on the opposite side have to say. At any rate, the use of such overcharged expressions as we have quoted is very undignified; and as far as we can judge by the reports in the newspapers, it would seem that the obnoxious and finally ejected delegates had the advantage of the virtuous majority in point of temper and forbearance; but we admit that it is difficult to form a just impression on such points from mere newspaper reports. With regard to the unwise and sweeping charges against the magistracy of the country, we observe that one delegate had the courage and common sense to say that he entirely differed from the majority, and to point out, moreover, that, even granting the charges made were well founded, the resolution proposed suggested no remedy.

There is another criticism which is unavoidably suggested by the prevalent tone of the Congress, and which the leaders of the trade unions should consider seriously. It is impossible to blink the fact that they are recommending for themselves some of the very methods which they condemn in other classes of society, and that while they complain of and make war on the evils of class feeling and class legislation on the part of others, they are continually and strongly asserting their own class feeling. They boast, one speaker did at least, that they had a power in their hands which would enable them to break down any monopoly and any class interest existing. They may or may not overrate their power in this respect; but, putting that aside, how are they seeking to establish and consolidate this formidable power of which they boast? Simply by endeavouring to establish a monopoly of their own, a monopoly of labour. We do not say there is anything immoral in doing so; we may go further and say that their form of monopoly is of a more honest and healthy type than some of those against which they contend, certainly far more so than such a monopoly as that which the ring of cotton speculators in Liverpool have been seeking to establish for their own benefit, and which was referred to at the Trade Unions Congress in terms which were not at all too strong, and with which we quite concur. But it is really absurd for people to assume this high and mighty tone against monopolies of every kind and in favour of free trade, when they are actually working in opposition to free trade in labour. Are they entirely blind to the fact, which is certainly patent to most people of understanding, that by their own action in forcing up wages and forcing down hours of labour, and curtailing the private advantages to be derived from individual superiority of talent among themselves, they have to some extent checked the outlay of capital in building operations, and sent some branches of labour largely into foreign hands? Again, the trade unions are eloquent against class privileges, yet the assertion of the rights and privileges of their own class, as a class, runs through the whole proceedings of this Congress, and almost its very last business was the reading, with evident approval, of a letter from a "committee of invitation" in Zurich urging their co-operation at an International Working Men's Conference, among the objects of which was "to arouse class feeling." Now, class feeling is one of the very evils which, in regard to all the rest of the world, they profess to desire to break down, and one which we on our part consider to be a very great obstacle to general progress and general good understanding between man and man. The abolition of the idea that working men are a separate class is one of the very objects which the wisest friends of the "working class" have in view, and which we really supposed was an object with the most intelligent and best educated of the working men themselves. And even if it were otherwise, where is the logical definition of the "working class"? Where does it begin and end, and what are its boundaries? No one can say. Among the members of a single trade or profession there may be legitimately and logically a kind of class feeling, which is better and more pleasantly expressed as *esprit de corps*, and is in most senses a natural and healthy spirit. But there is no real line of demarcation between "working classes" and the rest of the world, except the line which certainly may be drawn between those who do some work and those who do none at all, but live only for indolent pleasure. Apart from these, all of us belong to the "working classes," and the work of handicraftsmen is not more important to the world than many other forms of work, and if the craftsmen are told that it is, by injudicious and one-sided friends, they will do wisely not to believe such a gospel. The workman of one day becomes a "master" the next, and any capable and instructed artisan should feel that he carries in his basket the brass plate of the employer. What is curious in connexion with the subject, as considered in regard to this particular Congress, is that by a singular unconscious irony, the working men were commended, in a leading article in the *Times* in reference to the Congress, for having shown the world that they did not consider themselves a class apart; while the daily reports of the proceedings of the Congress, in the columns of the same journal, went directly to show the contrary.

We make these remarks in an entirely friendly spirit, and in what we believe to be the best interests of the trade unions, who would do wisely to consider carefully the ground which they are taking, and to content themselves with a more cosmopolitan, and, in some respects, less ambitious programme. At the outset of the movement the peculiarly class attitude which they adopted may have been necessary to break down the opposite interests of the capitalists, the relations between the two being at that time abnormal and unfair. But the ultimate object should be, not to set up one class against another, but to obliterate the idea of class, and to recognise the fact that all workers have equal interest in the general good, and that class demarcations and class feeling are entirely conventional and injurious to the general welfare of the community, and to the best mutual understanding and mutual help. Nor are the trade unions entirely justified in the very large claims they make to be heard on subjects involving the widest political and social interests. There are no doubt many secondary subjects more or less directly connected with their trades, which they may most profitably handle; nor is there any very obvious reason why the trade unions should not discuss political questions and make recommendations upon such questions with the degree of weight their numbers and influence can give them. But this, again, is no reason why they should claim to adopt the tone, as they certainly have done, of paramount arbiters and advisers on such questions. Education is needed for useful discussion of such subjects. To read the way in which some of the speakers expressed themselves,—the working

classes would not "tolerate" this, that, and the other,—it might be supposed that they were, or had a right to be, the governing body of the policy of the nation at large. What would they say if a congress of representatives of professions, or representatives of the landed interest, used the same tone? What an outcry the trade unions would then raise against class arrogance and class self-assertion. The trade unions are entitled to their share in influencing public opinion, and to no more than their share, and the sooner they recognise this the better. We willingly and cordially say that their tone on public questions is in the main a high one, and that much that is valuable and suggestive on important questions may be gathered from the debates of the congress which has just closed, from among a good deal which was one-sided and sometimes intemperate; but the didactic tone which pervades their expression of opinion, sometimes on topics which really have no connexion with the professed objects of a trade-unions congress, is to be deprecated as both unwise and out of place, and not calculated to increase their influence with the more thoughtful of the outstanding portion of the community.

Some of the special points touched upon in connexion with the working of the building trades we should have been glad to consider more in detail, but must defer doing so, at any rate, for the present.

THE COMMERCIAL VALUE OF ART.

WE hear a great deal in the present day about art, and in some quarters there has even been the expression, generally misunderstood, of positive nausea at the constant discussion of the question. But while there exists this feeling, prompted, doubtless, by the large quantity of "irresponsible chatter," the echoes of which reach us through the press from every quarter of the kingdom, the importance of art in all its bearings, social, moral, and commercial, is never lost sight of by the more thoughtful; they are, indeed, every day reminded of this fact, which, of course, to a great extent, is the suggestive cause of so much that we hear now said and written concerning art.

Theoretically, the subject of art and its influence has been for a century and more discussed, and ably, often exquisitely, discoursed upon by the favourite authors of Europe and America, and it is on the basis of these theories that so much has already been done to test their practical value; for it has at length come to be generally conceded that art has other bearings than its connexion with the painter. The sculptor or architect is still, however, in many sections of our strange society, scarcely recognised as an artist,—a word carrying with it to many only the idea of connexion with the palette. Happily, among the more influential members of the community such views are rare, though unfortunate stories are current in professional circles regarding the treatment of eminent artists even by members of our Legislature.

The importance of art as an essential commercial factor in our wealth as a nation, is daily becoming better understood in our practically-minded community, so much so, indeed, that it is gratifying to find that we are admitted by rival nations to be seriously menacing them on their own ground by our products,—countries whose commercial renown has long depended on their superior reputation for artistic skill.

In the present day the custom is much in vogue of reducing matters to plain figures. Now art, though essentially entering among the theoretical amenities of our existence, is capable of having its value reduced to the crude logic of statistics, and to those matter-of-fact seekers into the details of trade returns, as also to those who may be somewhat sceptical as to the commercial value of art, we beg to submit some facts, relating, it is true, to a foreign country, but that country one which has long justly held a world-wide reputation for the artistic superiority of its products,—France.

In a recent number of the *Révue des Arts Décoratifs*,—the joint publication of the Paris Museum of Decorative Art and the excellent institution of the Union Centrale, to which reference has more than once in these pages been made,—appeared an admirable article drawing the attention of the French manufacturing world to the ever-increasing tide of artistic products imported from abroad. France has long borne undisputed in the commercial world the palm in this respect, but within a few years foreign nations, aided by excellent systems of art-education, have succeeded in commencing a formidable rivalry to France and French products. France, satisfied with the reputation it has borne, has neglected to keep pace with the movement, and the more thoughtful members of the community foresee the possibility of a near future in which France may be beaten out of the markets of the world, and on the very point for which her products once held the foremost place. Such is the cry of alarm the writer of the article to which we refer has thrown out. His view he supports by figures.

In the first rank of art in the ordinary acceptation of the word, application is made to the statistics of the annual exhibitions. It would appear that of the exhibitors in this year's *Salon*, 1,439 were French, and no fewer than 416 were foreigners. On such facts, of course, no great stress can be laid. France in such a field can well afford, and in no way grudge, to spread abroad pupils who possess the mastery of their art which it would seem French institutions so successfully teach.

In a more practical direction the menace of foreign competition is evident. Comparing the statistics of 1880 with those of 1859, some definite results may be obtained. In 1859, France imported 61,650,000 francs worth (say two and a half millions sterling) of objects made abroad, a figure totally exclusive of all raw material or food-stuffs. In this total, half a million sterling was for objects acquiring value by their artistic worth. In 1880 the importations were 448,347,000 of francs (some eighteen millions sterling), a total in which enter some six millions of artistic products, the difference of four millions in the twenty years showing clearly the extent of foreign competition.*

Against the statistics of imports, let us now place those of the exports in the same year. Here, taking certain items (decorated cotton tissues, works in copper gilt, porcelain, playing cards, and cut coral) there will be found in the two columns ranged side by side a great diminution for the year 1880 as against 1859, but ample compensation is to be found in the characteristic items of millinery, books and engravings, bronzes, *objets de collection*, fashions, flowers, furniture, and jewelry,† almost each item of which, as reference to the details in the note will show, represents millions sterling. In all these instances it is to art and its application that is due the chief value of the products. It will be seen, we hope, that the commercial importance of a proper consideration of art and its practical application is worthy the attention of those unsympathetic with the more theoretical and æsthetic interests believed to be associated with art and artists. Such views are now, happily for the world at large, steadily gaining ground, with the direct result of causing France to look inquiringly into the boasted supremacy on which she has so far trusted and still continues too confidently to trust.

Statistics show that the exports of French products owing their commercial value to their artistic qualities amounted in 1859 to 665 millions of francs (some 26 millions sterling) and only 766 millions (30 millions sterling) in 1880, in twenty years an increase of only 15 per cent. In the former of these years one million sterling worth of artistic products was imported into France from abroad, and in 1880 no less than six millions, an increase of 488 per cent. We do not wonder that, in the face of such figures, there appears to the thoughtful Frenchman necessity for a cry of alarm at the danger signal ahead.

On our side a moral can also be drawn. England stands foremost among the rivals of France; within a generation England has made rapid strides in the direction of its art manufactures, as they are understood, and we owe this advance in great measure, not alone to our increased attention to art education, but to the wise foresight of many large employers of labour. Much, however, remains yet to be done: many efforts have to be made and results achieved in this direction. The commercial supremacy which France has so long owed to its artistic superiority,—a superiority it held almost undisputed as long as other nations remained in this respect behind-hand,—England may take, if not in totality, in great part at least. To the reputation we bear for the solidity and honesty of our products,—those chiefest elements of all truly artistic work,*—let us but add the grace, the elegance, and the due consideration to adaptability to use, qualities which are more generally understood to constitute art, and we may, as we already do in a great measure, hold a high position in the world for the artistic excellence of our products. It remains in the hands of our manufacturers, of our great employers of labour, of their numerous workmen and their directors, of the younger generation who are growing up under the teachings of daily-improving and increasingly-wealthy and endowed institutions. With the extension of the system of technical training, with the innumerable means now afforded of increasing, not alone our power, but our happiness, by the acquisition of knowledge, by the funds of originality suggested by a proper study of the contents of the storehouses of the art and industry of the past, our museums, we have it at our disposition to make an effort in a direction the attainment of success in which has at all periods of history formed the noblest aim of nations. To do this, and, in doing it, to raise our existence from the clinging horrors of sordid pursuits, to shed on the lives of those about us, in due proportion, the blessings of cultivation and refinement, would justify a large expenditure: it would be worth no small sacrifice to obtain in the commercial markets of the world as envied a place for the artistic value of our products as they long have held for their sterling worth and well-trusted honesty.

* Furniture in 1859, 1 million of francs; in 1880, 4½ millions; *objets de collection*, 2 millions against 10½ millions; arms 1 million against 2½ millions; cut coral, a quarter of a million against 3½ millions; wall-papers, 596 francs (!) against 1½ million; porcelain and faïence a quarter of a million against 4½ millions; glass, enamel, &c., 1½ million against nearly 3 millions; books, 2½ millions against 4½ millions; jewelry, a quarter of a million against 5½ millions; engravings and lithographs, less than half a million against nearly 7 millions.

† Exports: jewelry, in 1859, 15 millions against, in 1880 52 millions of francs (a million of francs is 40,000*l.*); fine mercery, 58½ millions against 85 millions; fashions, flowers, &c., 10½ millions against 32½ millions; furniture, 7½ against 15 millions; *objets de collection*, 2 millions against 14 millions; books, engravings, 18 against 28 millions; wall-papers, 5 against 6½ millions; bronzes, 5½ against 9 millions; sculptured marble, half a million against 1½ million; sculptured stone, half a million against 730,000 francs; false stones, &c., 9 millions against 11 millions.

THE MEMORIAL WINDOW TO MARY TUDOR.

IT has been announced that the Queen has just presented to the Church of St. Mary at Bury St. Edmunds a stained-glass window, in memory of Mary Tudor, the daughter of Henry VII., known in English history as "Mary the French Queen," from her marriage with Louis XII., but to our neighbours more familiar as "La Reine Blanche," the incidents of whose life suggest the decorative motive of the window.

The story of Mary Tudor forms one of the many links that exist between the history of our own country and that of France. The young "Marie d'Angleterre," if scarcely as familiar to the French as is with us the French queen of Charles I., Henrietta Maria, has left in France a remembrance more than is attached to one merely of the many figures in the history of the country. Among the most widely spread of these associations is perhaps the connexion of Henry VII.'s daughter with the Mediæval building in Paris, now known to the public as the Musée de Cluny. Every visitor to Paris will remember the peculiar character of the Cluny Museum lodged in the quaint hôtel in which M. du Sommerard (the father of the present excellent director) had gathered the collection which was purchased from him by the French Government in 1843. The rooms of the former dwelling-house, now the museum, have to a great extent been left in their original condition, or, like the architecture of the rest of the building, have been restored. Of these rooms, that next the chapel,—the beauty of the architectural remains of which is familiar to every professional student,—bears the name of the Chambre de la Reine Blanche, a memory of the stay made at the Hôtel Cluny, in January, 1515, by the young widow of Louis XII., Mary Tudor, during the days of her mourning. An air of romance seems to linger round the room, which,

* When the Carlyles, as we see by the recently-published "Reminiscences of Carlyle," were about to leave Scotland for London, Mrs. Carlyle wisely determined to bring with her the family furniture, on the score of its solidity and honest workmanship. "Respect what is truly made to its purpose, detest what is falsely, and have no concern with it." "My own heart," remarks Carlyle to himself, "could not have been more emphatic on that subject . . . . My writing-table, solid mahogany, well-devised, always handy, yet steady as the rocks, is the best I ever saw. No book could be too good for being written here, it has often mutely told me."—See "Reminiscences of Carlyle," vol. ii., p. 169.

we cannot doubt, affects even many of the English and American visitors who pass through the museum without a thought of its historic memories, and still less its connexion with "home." The Chambre de la Reine Blanche is familiar to every artist who knows Paris, and often has served as a suggestive background for some *Salon* "hit," for the room retains much of its old decoration, which, when the hôtel was put in order, was discovered under the more modern paperhangings. The paintings, characteristic Renaissance works of the reign of Henri Deux, and representing groups of Italian ruins, with accompanying garlands and medallions, were in a sufficiently good condition to bear restoration, and they still exist to show to the present generation an excellent specimen of the domestic decorative art of a period which is now much in favour.

The residence of the young English queen at the Hôtel Cluny appears on historical evidence to have been at the invitation of Francis I., who had succeeded his father Louis XII. "The king gave order, we learn from the secretary of Cardinal Duprat, that the Queen Marie, widow of the late King Louis, should be honourably entertained, and the queen came to lodge at the Hostel de Cluny; the king coming often to visit her, and paying her every attention in his power." The chamber occupied by the princess has retained to this day, as we have already remarked, the name of the Reine Blanche, it having been the custom for the French queens to wear white during their days of mourning. Mary Tudor's mourning was not of long duration; she, indeed, regretted but little the royal husband who had been forced upon her, and who, on his sick bed, had, as he told her with much courtliness, given her as his New Year's gift her freedom by his death, and but a few weeks passed before the young widow, who had been warmly aided in the affair by Francis I., married an old flame, the handsome Charles Brandon, Duke of Suffolk, the original of one of the extraordinary series of portraits we owe to the patient exactitude of Holbein, and which was exhibited, it will be remembered, some years since at South Kensington. At the same exhibition there were two portraits of the duke and his wife, one by Holbein, the other by Mabuse, both bearing the famous and familiar lines:—

> "Cloath of Gold, doe not despise,
> Tho' thou art matcht to Cloath of Frize;
> Cloath of Frize, be not too bold,
> Tho' thou art matcht to Cloath of Gold."

As a fact which still further shows the many links existing between our own country and France, the daughter of Henry VII. had been married to the French king in the then royal palace of the Tournelles, the home since the Middle Ages of the French court, and occupied during the fifteen years' possession of Paris by our English troops at the commencement of the fifteenth century, by the Duke of Bedford, the regent in France of Henry V. of Agincourt fame, the father of the young Henry VI. who was so pompously crowned King of France in the Cathedral of Notre Dame. The home of the Regent Bedford disappeared when the court moved to the Louvre, built by palace-loving Italian-bred Catherine de Medici, and on the site of the Mediœval palace of the Tournelles, with its pepper-castor shaped towers, now stands the seventeenth-century red brick Place Royale, better known to Republican France as the Place des Vosges.

A word more on an incident connecting additionally the past of the Cluny Museum with the history of England. Not many years after Mary Tudor had left behind her the tradition of her residence in the old hôtel, was celebrated within its walls the marriage of James V. of Scotland with Madeleine, the daughter of Francis I. It was from this union that was to spring the unfortunate queen, whose sad story is one of the most familiar of the romances of history,—Mary Queen of Scots.

Highbury Vale, London. — St. John's Church, which has been erected from the designs of Mr. Wm. Bassett-Smith, has been consecrated by the Bishop of London. It has a spacious and lofty nave, five bays in length, with north and south aisles; a chancel the same width as the nave, with a five-sided apse and aisles on each side. It provides accommodation for 820 adults, and the cost of the building has been about 7,000*l*. The works have been carried out by Mr. M. Manley, of St. George's-road, Regent's Park, under the direction of the architect.

THE DUST-HOLE.

NOTWITHSTANDING the modern love of luxury,—and especially the luxury that consists in a high degree of comfort and cleanliness,—we are not quite aware whether modern ingenuity has devised a perfect means of successfully housing, until its removal, the accumulation that we erroneously call "dust," but which actually consists mostly of decomposing and decomposed matter, with the peculiar nature of which most householders are familiar. The care, the labour, and sometimes, for their own sakes, the thrift of our domestics, contrive often to keep the offensive dust-hole at a sufficient distance from the eyes and nose of the owners of large houses to make a few of us, perhaps, unacquainted with the horror of this portion of the lower regions of our dwelling-places, but there are few of that numerous class in whose careers we are all so much interested,—the servant-class, as they are called,—who have not to endure every day of their lives the inconvenience and the actual danger arising from the dust-hole.

Here and there we find the situation of the dust-hole in the lower regions, ingeniously contrived so as not to be altogether unsightly, but it has an unfortunate way of asserting its presence; under any circumstances it occupies a space of ground, and pays ground-rent sufficiently important to call for some thought as to whether its room is not of more value than its company. But how, it will be asked, is the dust-hole in our houses to be got rid of? The contents of the dust-hole were once considered of value. Contractors were glad to take upon themselves the task of removing the dust from our houses; but things seem to have changed in this respect, and the business appears too large for the ordinary mind to grapple with, and complaints are now constantly made of the parish authorities whose duty it is to clear out the contents of our dust-holes whenever the accumulation requires. Some steps, it is evident, therefore must be taken in this direction.

Why should we not have recourse to the Parisian principle of doing away altogether with the dust-hole in our houses, and adopt the plan so successfully pursued by our neighbours of removing the accumulation of twenty-four hours, placing at the door of each house a movable receptacle containing the dust, and the contents of which are taken away before a certain hour in the morning by properly and strictly controlled contractors? In Paris the contractors are the municipal authorities, who, with the assistance of the police,—who have a certain control in the matter,—secure for the smallest apartment or the largest house a freedom from that horrible offensiveness that a dust-hole possesses after a few days' neglect, and from which, indeed, it is never entirely free from the imperfect manner in which, from its shape and the nature of its contents, it is emptied. The dustman and the *chiffonnier*, or rag and paper gatherer, in Paris, are the industrious removers and utilisers of the refuse of the town; they serve, indeed, as the human insects, the scavengers of nature whose use Sir John Lubbock could doubtless tell us so much about, and without whose action the world would be seriously inconvenienced.

The dust-question is one which would seem to puzzle not a few communities in the present day. Our practical cousins in New York have long allowed themselves to suffer serious inconvenience from the management of their dust-barrels which so unpicturesquely litter the "side-walk" of their streets, every puff of wind scattering in the air the varied contents of these neglected and unremoved dust-bins. But American ingenuity, although unable apparently to combat the glaring mismanagement (to say the least of it) of the municipal funds supposed to be devoted to the cleansing of the streets, has, we learn, devised a method which promises, to some extent, to reduce the evil of the storing of the decomposing matter,—which forms, in reality, the chief difficulty of the unemptied dust-hole.

A paragraph in the current issue of *Scribner's Monthly*,—a magazine whose practical treatment of social questions is by no means allowed to decline in favour of its exceptional artistic qualities,—describes a small and inexpensive crematory stove for the consumption of household rubbish. It has long been a custom, and a very objectionable custom, known to the cook and housewife, to throw on the fire much of the kitchen refuse, with the result, arising from the imperfect combustion of a mass of damp material, of producing an intolerable stench. The new American crematory stove is described as consisting of a zinc pail fitting on to the hole in the top of the ordinary kitchen stove or range, and by a simple system of double interior forming into a desiccating machine. The rubbish, when fully dried, passes into the fire from the pail by a false and movable bottom, and is, of course, rapidly consumed. As a means at the disposition of every householder of utilising his refuse, the new crematory stove promises something; it is, however, but a half remedy for the unsightly, unsanitary, and needless infliction of the regulation dust-hole, whose contents in a well-organised community should without fail be removed every day.

THE "LIVADIA" AT HER LAST MOORINGS.

WE confess that we entertain a horrible suspicion of a certain class of asserted scientific discoveries. We refer to such as drive, like a thunderstorm, in the teeth of the fair winds of either ancient learning or of modern progress. Not but that there are ebbs and flows in the great tide of science, or that that which was but yesterday thought to be a gain may by the experience of to-day be shown to be a loss. Of that we have abundant example. But we rather refer to what we take to be a special characteristic of the present day,—the discovery *ab ignorantiâ*. It consists in neglecting two or three of the essential elements of a compound question, and then finding it very easy of solution. It is as if, in an equation in which x and y are both unknown quantities, you assume that x *must* equal ten, and then proceed to solve the equation. It is like the reform in painting which consists in omitting aërial perspective, and paying scant heed to accuracy of drawing. It is like that pseudo-science which affects to predict the course of human affairs, leaving out of view the peculiarities of human nature. It is the improved version of "Hamlet," with the part of *Hamlet* omitted.

Such seemed to us to be the character of the blast of trumpets, penny and other, which welcomed the launch of the *Livadia*. Great names stood as godfathers to the vessel. An Imperial Admiral had adopted the ugly babe. Special correspondents baptised its first trip with champagne; and a gentleman considered to be a high authority on the construction of ships threw all the weight of that authority into the scale of praise.

We were members of but a small minority. We are not aware whether any other members of the Press ventured to hint a doubt, or hesitate dislike. From the first we were of opinion that to revert to the primitive form of the tub, even more ancient for flotation purposes than the square coracle of the ancient Britons, still to be seen on the Towy, and not unknown to boating men at Oxford, could be nothing but a blunder. We waited for details of the first voyage of the *Livadia*. It was not made at the speed promised, but such excellent reasons were given, as to prudence in steaming slow, for fear of meeting a fog, or something to that effect, that we thought the apologies more suspicious than the delay. Then some floating wreck knocked a hole in her bottom. One or two trifling accidents kept the vessel from proceeding on her cruise. She was a great success,—every one knew that. Great authorities proved that; and the present of 40,000*l*. to the builders completed the overwhelming proofs. Still, in spite of all, the *Livadia* lingered at Ferrol, and the demonstration of the great success was postponed to a more convenient season.

A more convenient season, at least for the opponents of the *Livadia*, has now arrived. A commission has sat in judgment on the famous yacht, has tried the *Livadia*, and found her wanting. "She is slow, she rolls heavily, she is too weak, and she is made of bad materials!" We cannot but suspect that here the pendulum has swung too far in the opposite direction. That such a cross section was utterly inconsistent with speed or with economy of steam power, we stated in the first instance. No one familiar with the result of Mr. Froude's beautiful experiments on the forms proper for ships can doubt that. Whether she rolls heavily we cannot say. The very aim and object of her being was,—not to roll; the fair-weather description of her one voyage dilated on her steadiness. Here, then, we should like some more reliable evidence than that of the Imperial Commission, which has

discovered that the unfortunate ship is built of bad materials. As to that, we shall probably have a word or two from the builders, who received so substantial an acknowledgment of the excellence of their work. That the vessel was not strong enough is a natural vice of her design; and we are inclined to suspect that the three distinct propellers may have so acted as actually to tend to tear the vessel asunder. We think that the report of the Commission bears more sign of political bias than of engineering investigation. But as to the condemnation, and the necessary condemnation, of the *Livadia*, there is no doubt, although the Commission have done their best to render ridiculous their own report by recommending that a smaller *Livadia*, on the lines of the turtle ship, should be constructed out of the materials of the demolished monster, not of the deep, but of the shores.

BUILDING AND ENGINEERING CONGRESS IN DANTZIC.

THE tenth assembly of delegates from the associations of architects and engineers in different parts of the German Empire, has recently been held at Dantzic under the direction of the Central Union of these societies. The proceedings are interesting to English members of the two professions represented, as in addition to dealing with the official and technical subjects which naturally were discussed, the delegates gave much attention to matters affecting the relations between their societies and the respective Governments to which they are subject, as well as to economical and other topics which refer to the connexions of professional men with the community at large.

The total number of societies represented at the Congress was seventeen, and the number of delegates thirty-two; the total votes were fifty-six. Of the twenty-six societies which compose the Union, nine were absent, but the composition of the assembly was such as to make it represent with fitness the two professions as they now stand. The societies belonging to certain provinces or districts were those of Bavaria, Saxony, Middle Rhine, Lower Rhine and Westphalia, Schleswig-Holstein, West Prussia, East Prussia, Brunswick, and Thuringia; while the societies attached to particular cities were those of Berlin, Hanover, Hamburg, Breslau, Dresden, Lübeck, Bremen, and Aix-la-Chapelle. The central authority was represented by Herr Professor Köhler and Herr Schwering, the former being president of the assembly; the vice-president and secretaries being selected from amongst the delegates.

The proceedings commenced on Monday, the 29th ult., but the bulk of the delegates and visitors had arrived by the preceding day, and had had an opportunity of meeting in a social manner, so that old friendships could be renewed and new acquaintances formed before the official inauguration of the Congress, which took place with due formality on the morning of the 29th, in the Council Building of the Municipality. The financial statement showed an expenditure of about 100*l.* by the Union during 1880, leaving a balance of about 70*l.* in hand. During the Congress resolutions expressing the thanks of the delegates for the reception accorded them by the civic authorities were cordially approved, and its duration was marked by several gatherings of a social character, which were fully appreciated as agreeable variations from the technical and economical discussions of which the proceedings of the Congress in a great measure consisted.

Proceeding now to record a few of the leading subjects of discussion, we note that the important subject of uniformity in technical nomenclature has met with a full share of attention. It is proposed to continue the special committee charged with the question of the uniform designation of mathematical and technical dimensions, the labours of which are progressing satisfactorily. The suggestion made at last year's meeting by the Leipsic society as to the nomenclature of the different floors of buildings, has been since then approved by many of the other societies. In this system, the floor wholly or partly underground, is called the cellar-story, the next the ground-floor, and the higher ones, first, second, and third stories. Intermediate stories of a subordinate character are called half-stories or mezzanine floors. It is stated that in Prussia certain official regulations stand in the way of the general introduction of this system.

The results of experiments as to concrete building, it was stated, will be published very shortly in one of the German technical papers, and therefore the question was not discussed.

The value of accurate details of a technical nature as to buildings and engineering works has long been recognised by the Central Union, and eight societies have collected in tabular form a variety of information as to 736 architectural and other works. An obstacle has been placed to the completion of this valuable work in its original extensive form, by the refusal of the Prussian authorities to furnish details of the State buildings under their charge. The Government has been for some time preparing for publication details of the same character as to all Government works executed since 1870, and therefore the authorities decline to help the Union in the matter. The information collected is, however, of such a valuable character that the Congress resolved to entrust the executive committee with the task of utilising the materials in their hands in the most suitable manner, either by publishing them separately, or by joining with the Government, in order that the work on which the State is engaged should be as complete as possible, and should serve as a standard book of reference for the building and engineering professions.

At last year's Wiesbaden meeting the invitation of the central body for members of the profession to exhibit plans of dwelling-houses had been amply responded to, but the collection was not typical of the domestic architecture of all parts of Germany. The assembly then approved a proposal made to publish the plans sent in, and to obtain such additional elements as would give the work a thoroughly representative character. The labours of the Mid-Rhenish Society in this direction have been successful, and the publication of this work seems assured, although more exact details cannot at present be announced.

Another work, prepared under the auspices of the Union, and which is nearer publication than those to which we have alluded, is the illustrated volume on wood-architecture now being brought out by the publishing firm of Ernst Wasmuth, of Berlin. Some proofs of the earlier parts of the volume were submitted to the meeting, and after a discussion of some length as to whether the illustrations should be photographic delineations or merely ground-plans and elevations, the meeting resolved to forward in every possible way the production of this useful work, and contributions were invited from those societies whose districts were not represented in the information now before the compilers of the book. It is expected that the volume will appear at latest within a year, and the fact that the publishers are undertaking all risks in connexion with it would seem to indicate their high appreciation of its technical merits.

Other matters of a professional nature were discussed which had been the subject of debate at previous meetings. In addition to these many new topics were introduced on which further information is looked for by the time of the next assembly. Amongst these we may notice the subject of the situation of young architects, and the question whether there is any means of improving the general position of the junior members of the profession in Germany. The improvement of the instruction at the practical schools was also touched upon, with a view to more complete discussion on a future occasion. Amongst the strictly technical points which were dealt with in a similar way, we notice questions as to the preparation of stones for building, and the use of glazed tiles for roofing purposes. These matters will be again treated at next year's meeting, when the experience of the various societies will be brought to bear on their discussion and ultimate elucidation, for the benefit of the building interest in general.

The questions of a more public character which occupied the attention of the Congress are such as to claim particular notice, as they deal with points affecting the relations of the professions with the different Governments and with private individuals.

The codification of the German civil law has been kept in view by the Union, and will still remain before it, although there is no immediate occasion for action. The publication of the work dealing with legal precedents affecting the responsibilities of architects and engineers towards the persons employing their services, is to be proceeded with on the basis of the materials which are collected by the end of this year, and the work is expected to appear in April, 1882. It has for some time engaged the attention of the Hamburg Society, and will include models of contracts and other information of value as to legal matters.

A most important subject of discussion, affecting the external relations of the Union, was the question of statistics as to building matters, which has for ten years been receiving the attention of the central body. The Bavarian society first suggested the collection of statistical information in such tabular form as would be valuable for purposes of reference to those interested in national economy, hygiene, and other sciences of a practical nature, while serving as a text-book for architectural students. The result of its experience has, however, led the Union to the conclusion that, as a central body, it is not in a position to bring the work to a successful termination, and that the intervention of the State can alone accomplish that end. It was, therefore, resolved that the Berlin Society (in conjunction with those of Bavaria and Hamburg) should prepare a memorial setting forth, with all possible lucidity and conciseness, the different points which require the attention of any public body undertaking the work. This memorial will be presented to the respective Governments interested, and, as it will summarise the work already done, it will, no doubt, facilitate the acceptance by the different authorities of the responsibilities which the Union invites them to undertake; in the carrying out of which, however, it promises to assist in every possible way.

An equally important subject of discussion was the altered position of the Union towards the International Patent Congress, in consequence of the absence of Germany from active participation in that assembly, and by the adoption of certain projects opposed to the wishes and interests of the German nation. The committee which had been engaged in watching the interests of Germany, being thus deprived of the means of action, did not, however, consider its mission ended, but set about the formation of a new organisation for the protection of German patent interests. The question before the Congress was whether the Union should as a body support this proposal, and although the presiding committee was in favour of the continued participation of Germany in this international question (with a view of preventing the country occupying possibly an isolated position), the decision of the assembly was for an opposite course, and such will therefore be adopted by the Union.

Amongst the subjects on which discussions were commenced (with a view to their more thorough ventilation next year) was the important question of the diffusion through the press of information as to building and engineering matters. One speaker attributed the general absence of such topics from the newspapers of the day to the apathy shown in many technical circles as to this subject. A resolution was adopted inviting the co-operation of the different societies forming the Union, in the work of diffusing through the daily press accurate information as to the transactions of the Congress, and thus enabling the general public to follow the development of building and engineering science. The technical press also received its share of attention during the Congress. The details published during the year as to technical societies in other countries by the Union were briefly considered.

The programme of the Congress included visits to some of the most interesting architectural and engineering works in the neighbourhood. Under the former head may be classed the Rathhaus (built in 1350), the Marienkirche (built in the fifteenth century), and the Franciscan cloister, which dates from the same period.

The water supply and drainage systems of Dantzic attracted the special attention of many professional visitors. Within the last twelve years these have witnessed the execution of improvements which tend to place Dantzic in a favourable sanitary position.

The harbour was also an object of interest, and an agreeable diversion from the fatigues of theoretical discussions was afforded by a trip in a steamer to the neighbouring harbour of Zoppot.

While thus giving a general idea of the scope of the Congress, we have had to pass over in silence many matters which might have proved interesting. Those mentioned by us will, however,

give some idea of the present position of technical matters in Germany, and if we take into account the attention which has been called to the practical parts of the sciences of building and engineering by this year's exhibitions at Brunswick, Frankfürt, and other places, it cannot be considered that a more fitting climax could be arrived at than that afforded by the theoretical congress at Dantzic, a report of whose deliberations we have endeavoured to present (though necessarily in an imperfect shape) to our readers.

KEIGHLEY AND ITS TRADE.

THE towns in the West Riding of Yorkshire are usually more distinguished for industry than for architectural beauty or for their historical associations; but one of the most notable,—Keighley,—is of great interest from its antiquarian associations, has had of recent years a marked and rapid growth, and has become a centre of one of our great trades. In the deep valley, at the junction of the little rivers Worth and Laycock,—if they may be called more than rivulets,—is the town which gave name to, and long sheltered, a knightly family, from which the dukes of Devonshire trace their descent. In the stormy days of civil war, Keighley was occupied by the Parliamentarians, and in 1645 there was a sharp attack and recovery. If, however, we leave the era of battles and bloodshed, and come down to the present century, we may find, in the comparison of the town as it is and as it was, one of the indications of growth of industries and of towns, of which Yorkshire affords many examples.

The irregularly-built little town had about half a century ago its full supply of water, and its gas supply; it had a neat court-house; the Leeds and Lancaster Canal gave it ample facilities for water conveyance; but the era of the railway was not. Its ancient church had been rebuilt at the beginning of the century; and that handsome structure, with its fine steeple and its "exquisite" clock, was one of the few ornaments of the town. There were seven or eight Dissenting chapels, and a free grammar school; and a mechanics' institute was in course of formation. About the town was an oasis of beauty,—blue heath on rugged hills contrasting with the fertile valleys, whilst the Aire was not then so much the reservoir of mills as it now is. The trade of the town in those days was largely in stuffs, worsted yarns, and cotton; the population, which had been 5,745 for the parish in 1801, had risen by 1831 to 11,176; and there were all the indications of further growth. There were in the town three cotton-spinning firms; there were curriers and leather-dressers; one or two hat manufacturers; three reed and heald-makers; and the like number of spindle, roller, and flyer-makers; whilst of worsted spinners and stuff manufacturers there were some thirty or so, but many of them were on a small scale. To Bradford, Leeds, Preston, Skipton, and Halifax, coaches went daily; there was the conveyance by water that has been hinted at; and there were half a dozen carriers. Finally, the state of the trade of the town is indicated by the fact that there was one postal arrival and despatch daily.

"Railways," said Carlyle, "have set all the towns of Britain a-dancing," and they have had their effect on Keighley since the opening of the Worth Valley Railway. The two great cotton-mills of Sir Richard Arkwright still lift up their tall heads; and worsted and cotton spinning, but in its wider form, constitute the chief trade of the town still, though there has of late been the introduction of the machine trade in one of its branches on a scale of some magnitude. Not so much a rapid as a steady growth has been known by the trade of the town, because the tendency has been in the textile trades generally to keep in the villages and to increase them as a whole, and hence it is that the growth of the West Riding, apart from the very hilly part, has been so general. But at the present time the tendency is becoming a little more marked to concentration in different localities, and it is to this that we have to trace the growth of the population of Keighley from 11,000 half a century ago to over 24,000 in 1871, with that growth since which the recent census has just shown. Except in the way of addition or extension, and in the smoothing down of some of the parts that showed its irregular character, the chief feature of Keighley has been its filling up and its attainment of some of the characteristics of towns. Its church and chapel accommodation has been increased, and it is possible that, though it cannot compete with its great neighbours yet, Keighley may show in time an order and an arrangement that will be creditable to it in its once-straggling buildings. It has for over fifty years been one of the centres of mechanics' union effort, and the work done by its institute is far above that accomplished in some towns of greater pretensions. In a recent year, that institute reported that the total number taught by its classes exceeded 900; that in that year, as the result of steady honest hard work in competition with other youth, a Keighley lad, taught at the trade-school, had gained scholarships of 210*l*. That trade-school is one of the features of Keighley, and this is due, in a very large degree, to the patronage that the Duke of Devonshire has accorded it; whilst various scholarships, maintenance grants, &c., sustain the connexion between it and the elementary schools of the town. About 140 usually attend the trade-school, and the work done, especially in the machine construction and practical chemistry classes, has long been noted as excellent. In the schools of art attached to the institute some scores of students yearly derive benefit; whilst in other branches of study the institute of Keighley is in a very considerable degree performing the work that its early promoters had in view. Its membership is usually from 2,100 to 2,400, or more than a twelfth part of the population; its annual income is from 1,500*l*. to 1,700*l*.; its library is of 6,000 volumes; in the penny bank there is yearly deposited about 1,300*l*.; and there are other indications of its value to the town, and of the after-results that must be expected to flow from the inculcation of the principles it teaches.

In this district there is that sturdy dogged type of character that Miss Brontë loved to picture in her little home three miles away. From the busy streets of the noisy town of Keighley, brawling ever and anon at its guardians' meetings, the mind turns to that pretty walk up the Worth valley to Haworth, where "Jane Eyre's" writer lived and loved her stern but beautiful moorland, and the people who dwelt there who merited the description "frosty but kindly." This is the phrase that may be said best to depict the town of Keighley, for a hard, shrewd, money-making race dwell therein, and the trade of the town is safe in their keeping. The want of minerals gives not that promise of rapid growth that the north-east of Durham and Yorkshire shows, but there is a steadiness in the trade, and a solidity in its growth, from decade to decade, that is not always associated with rapidity. And with a continued increase of that town feeling which produces public-spirited citizens, and provides for the people all the essentials of town life, there should be a still greater and higher future for the town, and a still more rapid increase of its trade. It has capital, enterprise, and technical skill; it is likely to enlarge its trade facilities; and it is giving to the growing generation that practical knowledge which will lead to the better use of the former advantages, so that the future success of the town and trade of Keighley should be assured.

ENGLISH AND ITALIAN ART WORKMEN.

IT is interesting to contemplate the difference between the art of the past and that of the present, and the difference between the modes of art production in past days and the art action of those who brought it into being, and of those who now bring art into existence. We know well enough, for it is sufficiently familiar, how a work of art, speaking generally, of to-day, is more or less rapidly, though by degrees, brought into being, and how many there are at times engaged in its production, *e.g.*, a painted glass window, or a group of statuary, not to speak of the decoration of a building. But there is a question of modern art action which, at the present moment, would seem to be of more than usual and passing interest, and it is that of the desirability of employing foreign art help; in other words, Is it possible, and if possible, desirable, to employ foreign workmen, with a distinct and individualised art and fine art of their own, to assist and even to lead in the production of an art, or architecture, with its ever-present sculpture and other decoration, foreign as art to such workmen, be the status of such workmen what it may? A recent letter bearing on this subject, by a student and workman who has sought out work in classic Italy and failed to obtain it, is suggestive, and points to matters artistic not a little curious.

In the first place, there is not, and can hardly be, an art-subject more curious and suggestive than that of the entire isolation of the nationalities and the fine arts of them of the distant past. If we go to antique Athens and try, as best we may, to realise the aspect of that famous city, so full of art, every street of it a museum, nothing probably would be found to be more striking than the isolation, and the sameness, so to put it, of its art, all about, and everywhere, and in all objects,—from its public buildings, its temples, and its monuments, down to the very commonest and most familiar articles of domestic use, its houses, and the furniture in them. All is Greek, and Greek only, and all is done by Greek hands, and the "handwriting" of such workmen is Greek, and Greek is as visibly written on it, and is as evident to the eye and mind, as is the nature of the material out of which it is wrought. There is no sign of foreign workmanship anywhere, or evidence of the existence of bodies of workers drawn from a distant and strange nationality. All and everything is Greek, and Greek alone. Free trade in art certainly did not exist in antique Athens, and the very isolation of the place, and its working for and exclusively by itself, whatever the disadvantages of such a course of action otherwise might be, had, there can be no doubt, this one advantage,—that it fostered a distinct and isolated nationality and language, and with them, a distinct and isolated art character of architecture and sculpture.

It was the same with Egypt and Assyria, for what can there be more isolated and fuller of individuality than the art and the architecture of old Egypt? To have borrowed anything, no matter where from, would have been to the Egyptian an all but impossible act,—he could not have done it. To have added anything foreign, any strange form or element, to his own special work, would have destroyed his art-faculty and instinct, and would have extinguished his very nationality. Indeed, may we not go yet further, and affirm that his architecture, great as it was, and as it yet is in its ruins, growing up, as it seems to have done, out of the necessary plans of his huge temples and temple arrangements and ritual requirements, could not have been at all, had he borrowed anything, or had he left his Nile river-banks for a foreign idea or for a foreign workman? And may not the same be said of the Assyrian, on another continent, for he was alike isolated, and with an art instinct and idea of his own, and certainly with an *architecture* peculiar to himself, so well fitted for the purposes and special uses to which he put it? The Assyrian, be it borne in mind, was on a level, as near as might be, with the Egyptian, and in the same stage of "civilisation," to use that somewhat ambiguous phrase, and, with the Egyptian, made up no small part of the world of that now so-far-off day.

We have thus but just glanced at the past of art, and at its mode of production, for the purpose of calling a moment's attention to the difference between it, and our modern and of to-day modes of doing the same work, and in the main, and speaking generally, for the like purposes; for, after all, human nature is the same all the world over, and through all recorded time. In the past, then, we see a number of distinct and isolated centres of art action and power; but in the present how different is everything! All is simply reversed. Art isolation, in the antique sense, has all but vanished, and art is day by day growing less and less distinctive, and more and more general, and art objects everywhere, in Europe at least, are all but alike. Nay, is it not a fact, and a right notable one, that there are what may be well termed "art centres,"—centres of art manufacture, which have been established for the express purpose of supplying generally the whole of Europe,—the world, indeed,—and its individual and separate nationalities, with art objects, and with things of every-day requirement, so decorated and ornamented as to suit, as it is thought, the special requirements, and art taste, and aspirations of those for whom the objects are manufactured? And, together with this, there is what may well be termed an all but universal idea and system of art teaching, thus compelling those who learn to imbibe like art-ideas and methods of work, all tending to the production of like "results."

And not only are the art-productions of each European centre, with each its separate nationality and language, getting to be more and more alike, and not at times to be distinguished the one from the other, but, what is more startling, there is the fact of the employment, by each nationality, more or less, of workmen foreign to it, from other and diverse nationalities, and it is beginning to be thought, by not a few, that this is a positive gain, and that the art-power of the time is increased by such method of work, and that, through it, a sort of general, and, so to phrase it, universal art-power, applicable generally and everywhere, must eventually and in time be created and become available. And no doubt this is so, as our schools of art prove, and as our periodical exhibitions of art products show. But whatever the advantage and the gain by such universal methods may be, and however systematised, and however perfect the results, of one thing we may be sure, that these results must needs be more or less alike and similar, and all but duplicates of each other, and that before such powerful and effective teaching, and uniformity of teaching, all "nationality" and almost individuality, must needs in time disappear. There may, as we say, be gain in all this, but there must be loss too, and a very great loss.

In the note to which we have referred, it is stated that a most determined resistance on the part of the Italian workmen was made to any interference with them, or to any attempt to add even but one more to their numbers. It would be not a little interesting to know whether this resistance to any addition being made to their numbers arose solely from this simple cause, or whether, in addition to this cause of alarm, there was not that of a desire to keep their nationality intact, and a determination not to admit a foreign art element or influence. The art they produced was Italian wholly, and must needs, as we may suppose, interest them as such, and the introduction of another style of art-handwriting may have been resented. Was this so? The English workman and artist may be, as he says, as good to the full as an artist-workman as those with whom he sought to ally himself, and this they may have been conscious of but it might have been curious to learn as to how far, if at all, they resented this intrusion of a foreign art element into their purely Italian art, and amidst their national way and method of producing it. That this would and must have been felt at divers periods of art history, there can be no doubt; and the interesting question hence here arises, does the Italian art workman of this present day feel this?

CASTLES OF THE EARLY ENGLISH PERIOD.

THE transition from the Norman to the Early English style, which in ecclesiastical architecture constitutes a period of great interest, is by no means, at least in England, so strongly marked in buildings of the military type. The rectangular and circular or polygonal keeps, with their Norman features, retained their hold upon English castle-builders through the reigns of Stephen and that of Henry II., 1135-1189, or for a century and a quarter from the Conquest, or even later. At Dover, the dog-tooth ornament and a bead moulding, combined with very decidedly Norman features, mark the transition period, as do the ornamental details of the rectangular keep of Helmsley, and the particulars of the shell-keeps of Tamworth and York. The later keeps are known by the increased depth of the pilasters, which become buttresses, as at Dover and Clun, and in the twelfth-century keep of Chambois (Orne); sometimes by their improved and fine-jointed ashlar, as at Hedingham; by a more frequent use of the stone of the district instead of that brought from Caen; by the presence of ribs upon the groins of the hip-vaulting of the galleries and mural chambers; by the use of nook-shafts at the exterior angles, as at Scarborough and Castle-Rising; and by the greater tendency to ornament about the rib bosses, door-cases, window recesses, and fire-places, and by the more or less Early English character of such ornamentation. The portcullis is perhaps less rare in the later keeps. There was, however, little change in the internal arrangement so long as the Norman outline was retained, and but little tendency, so far as the keep was concerned, towards flanking defences. Passive strength is still relied upon.

Little is known of the *castra adulterina*, of which so many score were constructed during the reign of Stephen, and destroyed by his successor. They could scarcely have been of the solidity of the Norman keeps, else their demolition would have been a more difficult task. They were probably either of timber, or mere walled inclosures of no great strength. Few, if any of them, represented the chief seats of large estates, and being built for the most part on new sites, the earthworks were inconsiderable, and where the works above ground were destroyed there was little left to show where was their site. Among the latest rectangular keeps should be mentioned the tower at Penhow, Monmouthshire, the cradle of the house of Seymour; and that of Fonmon, in Glamorgan, still inhabited. They are small, without pilasters, and with scarcely any Norman features, and belong to the Early English period, as, judging from its foundations laid open, and from some fragments dug up, several years ago, did the castle of Sully, near Cardiff, and probably that of Dunraven, in the same county, the remains of which are built into a later house.

By degrees, as the Norman towers and shell-keeps fell out of fashion, they were succeeded by towers of a cylindrical form, known as Donjons, and this change corresponds to the middle period of the Early English style in ecclesiastical architecture. Scientifically, in a military point of view, this was scarcely an advance, for the defenders of an isolated round tower could not concentrate their fire, and could only protect the foot of the wall by exposing themselves at its summit. On the other hand, with equal material, the round-tower was stronger, and more difficult to breach or to bring down by a mine. Also, it admitted of being vaulted in every story, and was thus more compact and less exposed than the rectangular keep to being set on fire, either from within or by balls projected upon its conical roof. Usually, however, in England, only the basement was vaulted, as at Brunless. At Pembroke the great round tower is vaulted at its summit, as are some of the cylindrical towers in the *enceinte*; but it is possible that these elevated vaults may be additions. At Coningsborough the basement alone is vaulted, and the vault is entered by a ladder from an aperture in the centre of the dome, under which is the well; the basement, as in Norman and Early English towers generally, being used as a store-chamber, and seldom, if ever, as a prison. In fact, in a single tower, whether rectangular or cylindrical, intended by its passive strength to defy attacks and to wear out the patience of a blockading force, an ample store of provisions was of the first consequence, and to their storage all the spare space was necessarily devoted. In those days, when the keep was the citadel, and not unfrequently used as such, prisoners were not kept within its walls. Dungeons there were none, save in a very few exceptional cases, and the basement or ground-floor was invariably occupied as a magazine.

These donjons were usually entered at the first-floor level, either by an exterior stone stair, or by one of timber; or sometimes, as at Pembroke, by a drawbridge, which dropped upon a detached pier, whence an inclined plane or a flight of steps descended to the ground level. In their elevated entrance, and in some other respects, these donjons recall the isolated towers erected during the decline of the Roman Empire, of which a good example, but square, remains at Autun. There are only two instances in England of the application of a fore-building to cover the entrance of these towers, but these, Chilham near Canterbury, and Orford in Norfolk, are late Norman, not Early English. Dolbadarn in North Wales, a rather later tower, but cylindrical, has an exterior stair of stone, which, however, may be an addition.

There were commonly three floors. The basement was for stores. The central floor contained the principal apartment, usually with a fire-place, and sometimes with mural chambers, one of which is almost always a garderobe. The flues of the fire-places and the shafts of the garderobes are often vertical, and contained within the wall. The upper floor, was either for the soldiery or for a bedroom for the lord. The walls are ordinarily 10 ft. to 12 ft. thick, and there is often a well stair, as at Skenfrith in Monmouthshire, from the first floor, leading to the upper chamber and the battlements. In some of the ruder towers, as in that near the church of Agbadoe, near Killarney, the ascent from the first floor is by narrow steps projecting from the interior face of the wall into the chamber. In the larger towers, as at Coucy, there is often a small chamber in the wall, over the main entrance, for the working of a portcullis. Now and then the staircase begins at the ground-level, ends at the first floor, and begins again at the opposite side, as in the rectangular keeps. Thus no one could leave his post on the battlements without the knowledge of the captain, who lived in the main chamber.

Where the cylindrical tower formed the donjon or keep, it was commonly placed within the area, as at Brunless and Skenfrith. At Coningsborough it stands upon the outer wall, at Pembroke on the wall of the inner ward; but in neither case is there any communication between the tower and the rampart of the wall. At Coucy the tower stands on an inner wall, but is girt about with a low concentric wall covering the foundations. At Launceston the annular space thus created between the tower and the girdling wall was roofed over, and there is something similar round the tower of Penrice in Gower. At Tretower a round tower has been built within an older rectangular keep, and the space between roofed over. In these cases the outer wall was about half the height of the tower. At Lillebonne and Coucy the tower has its proper ditch, as at Caldecot in Monmouthshire.

Coningsborough on the Don is the most complete English example of the Early English or Transition Norman cylindrical keep. Pembroke, though rather later, and of far inferior workmanship, is also, in its proportions and dimensions, a very fine building. Launceston, Tretower, Penrice, Skenfrith, Brunless, and Dolbadarn, are good examples, as are the Danes' tower at Waterford, and the small and rude, but very curious, tower at Aghadoe. At Nenagh also is a very fine tower, apparently of the Early English type. The round keep of Barnard Castle, though of nearly similar pattern, is of later date. At Whitchurch, near Cardiff, are, or recently were, the foundations of a detached round tower of considerable diameter, the base mouldings of which showed it to be of Early English date. At Caldecot, a fine old Bohun Castle, admirably described by Mr. Octavius Morgan, is a round tower, probably Early English, having a ditch of its own. This tower crowns a small and evidently artificial mound. It is now a mural tower upon the line of the outer wall, but it seems to have been cased, and the core is probably, or possibly, the keep of an earlier castle.

These English towers, though curious, are far inferior to those of the same period remaining in France, whether keeps such as Étampes, 1160, the plan of which is a quatrefoil; or Roche-Guyon, where one-half of the cylinder is absorbed in a triangular spur; or mural towers, as the King's Tower at Rouen, that at Carcassonne, and a specially fine one, lately restored, at Pierrefonds. The keep at Nuremberg is also a good example. The tower of the Louvre has long been destroyed, but its base was recently laid open, and found to contain two shafts, a well and a sewer.

Probably the round towers, or keeps, are the oldest examples of the form, but very soon afterwards they came into use in England and France as mural towers, flanking and strengthening the *enceinte* wall. They were especially used to cap an angle or to flank a gateway. There is an example of a round tower capping an angle, of this date, in the Tower of London, known as Bell Tower. Marten's Tower at Chepstow is a good example of a mural tower of the Early English period, having a fine oratory attached. Its interior is a complete cylinder, but the exterior, or gorge wall, seen within the court, is flat. At Rochester, the angle of the ward next the keep has a circular tower, or rather a buttress tower, as it is not higher than the curtain. In such positions their passive strength was a great advantage.

In the latter part of the twelfth and the beginning of the thirteenth centuries much was done to introduce domestic comfort into castles. Fireplaces, which in the Norman keeps are but recesses in the wall, often with a mere lateral orifice for a smoke-vent, as at Colchester and Rochester, are now adorned with hoods, often of stone, sometimes of wood and plaster, and the flues are capacious and calculated to carry off the smoke. The stone hoods are usually of excellent masonry, and, even when plain, of much elegance of design, resting upon

brackets, and these on clustered columns flanking the hearth. The vent or flue is often capped by a chimney-shaft and smoke lanthorn, such as may be seen at Grosmont and St. Briavels castles, or in the remains of the Priory at Abingdon. Where the hood was of wood or plaster, with a shaft of the same, or where there was an opening or louvre in the roof, all traces are, of course, gone, and thus is explained the absence of fireplaces in rooms evidently intended for ladies and persons of rank.

In the Norman keeps boarded floors were a necessity, and very ill-jointed and cold they no doubt were, but with the vault the floors were composed of beaten lime and sand. Garderobes continued to be frequent, both in mural chambers and on the battlements, and the shafts were usually vertical, and descended within the wall, having an outlet at the foot of it. The hall, chapel, and other buildings, placed usually in the inner ward, were more ornate than in the Norman period.

In addition to the flanking defence afforded by towers upon the line of the *enceinte* wall, there was in general use a contrivance called a "Brétasche." This was a gallery of timber running round the walls outside the battlements, and at their level, supported by struts resting upon corbels, and covered in with a sloping roof. Sometimes, in large towers, there were two tiers of these galleries, the upper projecting beyond the lower, and thus affording a very formidable defence. As these galleries concealed the top of the wall, this part was often left in a rude state, and now that the *brétasche* is gone, such towers, as at Caerphilly, have a very unfinished appearance. The *brétasche* was only put up when a siege was expected, and examples of it are very rare indeed, although it is evident in numerous instances that it was formerly in use. There remains a fragment of the actual *brétasche* over the Soissons gate of Coucy; and at Ledes, over the outer gate, is the place of its main beam. The tower of the Palazzo Vecchio at Florence shows by its lines of corbels that it was intended to carry a *brétasche*, and a door is seen, as at Norham, in the wall, which could only have opened upon a timber gallery. Château Gaillard, the work of Richard I., has what is not unlike a *brétasche*, executed in stone.

The best example in England of the kind of tower which succeeded to the rectangular and shell-keep of the Norman period is the keep of Coningsborough, which, though containing certain Norman ornaments and details, belongs to the Transition period. It stands on the summit of a natural hill, and forms a part of an earlier *enceinte* wall, which has been clumsily broken to admit it. The tower, about 70 ft. high, is cylindrical, about 50 ft. diameter at the base, and 40 ft. at the summit, but the cylinder is supported exteriorly by six buttresses of great breadth and bold projection. There is a basement domed over with a central hole above the well. The only entrance is in the first floor, about 12 ft. from the ground. The upper floors and the roof were of timber. The staircases are in the wall, winding with it. There are two garderobes, two fireplaces, no portcullis, and in the upper part of one of the buttresses is an oratory. The roof was a cone, but sprang from a ring wall, about 3 ft. within the battlement wall and the rampart walk. By this means the tower could be defended without a *brétasche*, which would not have been the case had the roof rested on the outer wall. A similar arrangement may be seen at Marten's Tower at Chepstow, and at Pembroke.

It is not, however, in England that the best examples of these Early English or Transition keeps are to be found. In rectangular and shell keeps England has some fine remains, but in France Philip Augustus carried the new style of building much further, and even now there remain keep towers of that time which have defied time and the madness of the Revolution, and still remain tolerably perfect. The greatest triumph of the period, in this case early in the thirteenth century, is the tower of Coucy, probably the finest military tower in Europe. It is the keep of a castle which is itself the citadel of a town, also strongly fortified. This wonderful work, a cylinder of fine masonry about 98 ft. in diameter, and rising clear and unbroken to 180 ft., was the work of Engerrand III., Sieur de Coucy, and the most powerful Baron of his age. The walls are of great thickness, and the basement and upper floors, three in number, were vaulted, each in twelve deep and pointed cells. A fosse, paved and walled, 20 ft. broad and 12 ft. deep, the counterscarp of which is raised as the wall of a *chemise*, surrounds the base, and protects it from the operations of the miner. A drawbridge, crossing this fosse, leads to the first floor of the tower by its only entrance, which is protected by a portcullis, an interior *meurtrière*, and a stout door. From the entrance passage a staircase ascends in the wall, at first direct, and afterwards as a turnpike, and supplies each floor, reaching finally the ramparts. The basement was the store, and above are state and other chambers. The well, of large size, is in the basement, and each floor has its fireplace and garderobe. The roof was conical, and rested upon an internal wall, outside of which was the rampart walk, protected by an unusually lofty parapet, surmounted by a heavy bold coping, and pierced by twenty-four doorways, intended to open into the timber *brétasche*, while between the doorways are twenty-four loops, intended to be used when the *brétasche* was not fixed. A curious evidence remains of the manner in which this tower was scaffolded. A double row of putlog holes are seen to wind round the tower spirally, in two parallel lines, showing that as the wall rose it was surrounded by a sloping roadway of timber, of which the main beams were thrust into the wall, and supported by struts, the lower ends of which rested upon blocks in the lower holes. A similar arrangement may be seen in the north-west tower of Harlech Castle, commencing at the top of the curtain-wall. So strong was Coucy keep that when, at the command of Mazarin, powder was exploded in its basement-chamber, and the vaultings throughout, thus lifted, fell, the cylinder, though cracked, was not thrown down. This noble example of a thirteenth-century tower has been successfully repaired by Viollet-le-Duc, who closed the fissure, and made the tower apparently as sound as ever.

Nor does Coucy, though the chief of the towers of the thirteenth century, stand alone in its magnificence. Issoudun, known as La Blanche Tour, is remarkable for the position of its entrance-door, and for its well-stair contained in the projecting spur; Tournebut, Cosson, Verneuil, Chinon, Villeneuve-le-Roi, Semur, Alluye, Bourbon-l'Archambault, and Châteaudun, are a few only of the round towers or donjons, scattered over France, and dating from the latter half of the twelfth and from the thirteenth century.

There is a peculiarity in these French towers unknown in England. Where, as at Château-Gaillard, they are exposed on one side to be battered, they are constructed with a projection forming a right-angled salient from the cylinder, which thus becomes keel or boat shaped in plan. This spur has a fine effect, and being usually solid, adds much to the strength of the tower. This projection, of which Roche-Guyon is a fine example, and which ascends the whole height of the tower, is very different from the spur-buttress, by which a round tower rises from a square base. This is especially common in Wales, and may be seen producing a good effect both at Chepstow and Goderich.

Of cylindrical keeps, either of early English or late Norman date, in England, may be mentioned Brunless, near Brecon; probably Caldecot, Monmouthshire; Coningsborough; Dolbadarn, in North Wales; Launceston; Pembroke; Penrice, Glamorganshire; Skenfrith, Monmouthshire; and Tretower, county Brecon. The round tower at Barnard-Castle, a very fine one, already mentioned, is later.

The reign of Henry III., 1216-1272, was long, and that prince was a munificent patron of art, and especially of architecture; nevertheless, and notwithstanding the internal dissensions of the period, the reign produced (excepting perhaps in South Wales) but few original castles, and those not remarkable for grandeur. The cause of this was that the country was already rather overfurnished with castles, so active had the Norman lords been during a century and a half, and the positions of the existing castles being well chosen, and their keeps of a substantial character, it was found better to add to them, when space was needed, rather than construct new ones in new positions. The itinerary of John shows that almost all the great castles of the country were even then built, and the use to which they were so frequently put may well have made the successors of that sovereign anxious rather to destroy than to build. Thus Bedford, a very early and very strong castle, was held by Hugh de Brèanté against the king in person, and was only taken by assault after a vigorous siege of two months, after which it was not only dismantled, but destroyed, its ditches filled up, and the materials of its walls and towers used for other constructions. Sometimes, however, where it was desirable, as in London or at Porchester, or Winchester, or Richmond, to retain the existing castle, either *enceinte* walls or more extended outworks were added, affording more accommodation for troops or for live stock for the garrison. Palisades gave place to walls, and mural towers and gatehouses, of large size and great strength, were added. Sometimes, as at the Tower of London, an outer ward, encircling the older building, was added; in other cases, as at Corfe, Chepstow, and Barnard Castle, the new ward was applied on one side, or at one end. In these augmented castles the keep was still treated as an interior citadel, a last resource or refuge, and was protected by one or two lines of wall, with mural towers, usually round or half round, and by gatehouses, composed of two round towers with the entrance between them, the new area within being proportioned to the importance of the place.

These composite structures are the earliest to which the term concentric is properly applicable. Where the keep is central, and the *enceinte* double, as at the Tower and Dover, the result is a very perfect example of the concentric type of castle, though of course the parts are of different dates. Of Kenilworth, and probably of Bridgnorth, the original arrangement was concentric, although the central part is a ward or walled enclosure, not a single isolated keep tower, which in these is worked into the line of the inner ward wall. As the outline of most castles was materially affected by the disposition of the ground, it is obvious that no classification as regards chronology can be based altogether upon the ground plan. At Alnwick, for example, the outline of which is probably Norman, and to some extent governed by the ground, the keep stands between two wards, and is the connecting part between them, and so at Chepstow and at Pickering; while at Richmond, also Norman, the arrangement is wholly different, as it is at Porchester, where Roman walls have been turned to account.

South Wales contains some castles which appear to have been altogether built, though possibly on old sites, in the reign of Henry III., as Cilgerran, Manorbeer, Grosmont, and Whitecastle. These, especially Whitecastle, are mere enclosures of irregular plan, within a strong curtain wall, supported by mural towers almost always round, and entered between two such towers as a gatehouse. The domestic buildings or lodgings, as the hall, sleeping-rooms, kitchen, offices, and stables, which in a regular English castle were of masonry, in these Border structures, such as Whitechurch, were partly of timber, with flat or moderately-sloping roofs, built against the walls of the area.

In the royal castles, and others the "capita" of estates and seats of the greater barons, great attention was paid to domestic comfort and splendour. The records contain many sheriffs' accounts for additions or repairs for domestic buildings within the castles, for painting the walls in fresco, or filling the windows with stained glass, all showing a vast growth in taste and luxury. More attention, indeed, was paid to these matters than to the military defences, for the castles in time of peace were allowed to fall into disrepair, and scarcely any garrisons were kept up. When a rebellion broke out, and the castles of a district were threatened, the patent and close rolls are filled with orders to the sheriffs, constables, and castellans, to supply timber, nails, lead, cordage, barrels of arrow-heads and cross-bow bolts, calthrops, bow-staves, and now and then military engines, which were collected from all quarters. All, however, was done hastily, and any masonry work erected under such circumstances is generally found to be of inferior quality, and in marked contrast to the masonry of churches and ecclesiastical buildings of the same period.

In the reign of Henry also began to be constructed fortified dwelling-houses, embattled and usually moated, but not regular castles. The invasion of the prerogative, under Stephen, led to its enforcement with strictness in the subsequent reigns, but as there were few new castles, it was chiefly in favour of fortified houses that the *licentia kernellare* was applied for and granted. The earliest extant licence of this character dates from this reign, and about a score altogether appear to have been issued by Henry. Of these, six only were applied for by considerable barons, and in only two cases for castles of consequence, namely, Dudley and Belvoir.

G. T. C.

ENTRENCHMENTS OF THE YORKSHIRE WOLDS.

IN the Anthropological Department, British Association meeting at York, General Pitt-Rivers, F.R.S., read a paper on "The Entrenchments of the Yorkshire Wolds and the Excavations in the Earthwork called Danes' Dyke at Flamborough." The district consists of four patches of high ground separated from each other, and bounded by five principal valleys. Assuming most of the low ground to have been occupied in prehistoric times by marsh and jungle, there would remain only the plateau lands on the hills for the inhabitants to live upon, and here, as might be expected, we find the ground covered with their remains. Flamborough Head and promontory must, of course, have formed the base of operations for warlike purposes in any case, whether of an invading or retreating force. In the former case it would be the first, and in the latter the last, point occupied by any people at war with the inhabitants of the interior. The high cliffs precluding all possibility of an attack by the sea, and leaving only the land side to be attended to, they would naturally expect to find an entrenchment facing westward, and occupying the first suitable position westward. Such an entrenchment they found in what was commonly known as Danes' Dyke, a misnomer, as he would show. The Dyke runs north and south a distance of two miles and a half from sea cliff to sea cliff, and at a distance of three miles from the centre of it to the point of the promontory. It has a ditch on the west or inland side, showing that the enemy was expected from that quarter. It is judiciously chosen, and on the whole commands an extensive view of the country for some distance to the westward. There are twelve gaps through it, some of which are no doubt modern. A small stream coming from the north runs through the entrenchment, affording a supply of water to the defenders. The entrenchment is of nearly uniform height all along, being about 18 ft. above the level of the ground, and having a ditch 60 ft. wide at the outside. Of the defensive character of the entrenchment there could not be the slightest doubt, and it was a work of great strength, probably surmounted originally by palisade, and implying a large and well-disciplined force for the construction and defence of it. With the exception of two entrenchments between the north end of Danes' Dyke and Speeton, which run from the edge of the cliff southward, and the ends of what have been ploughed out of cultivation, nothing of any consequence occurs in the way of military defence until the great position at the ancient village of Argam. On the north wold an entrenchment runs along the top of the escarpment of the Derwent valley. It originally extended from Hunmanly on the east to above Heslerton on the west, and guarded the north wold hills from an attack from the Derwent valley. A branch from the dyke defends the wold hills from any attack by the north-west up the valley at Wintringham. Behind and parallel to this, two miles in the rear, are double dykes running between Kirby-Grydalythe and Butterwick, also occupying a strong position on the hills toward the north-west. Behind this again, a mile and a half in the rear, are other dykes parallel to the last, running between Sledmere and the hill west of Hewing, also occupying a position for defence against the north-west. Besides these the north wolds are covered with numerous smaller entrenchments. After describing what he considered as the most instructive portion of the whole district, the oclite range to the north of the Derwent valley, which included a system of defence persistently adopted in all prehistoric works in this country, whether camps or dykes, the author described how, with the kind permission of Messrs. Dormer, to whom the ground belongs, he commenced an excavation at the Danes' Dyke, on October 13th, 1879. A number of flints and flint flakes were found, affording evidence that the defenders of the earthwork used flint, and consequently that the work itself was not later than the bronze period, and was, in fact, of the same age as the tumuli of the Yorkshire wolds. They were narrowed to the opinion that the invaders of Flamborough, if invaders they were, were the same people who landed on the south and south-east coast of England, or else that these dykes belonged to the people of the country, who, having imported the bronze culture from elsewhere, were driven to the coast by another and more powerful race who occupied the interior, and that these defences were associated with their last occupation of the soil of Yorkshire. Further than that he did not venture to particularise. He trusted it would be admitted that the excavations and observations he had made landed them somewhat further on the road to knowledge than they were before. Notwithstanding the traditions which connected the place with the Danes, and the prevalence of a Danish element in the population of this country, the traces of which had been so well brought out by Mr. Atkinson in his history of Cleveland, this ground was the scene of operations of a very much earlier people, a people who, though ruder in their culture, were much their superiors in the art of war, formidable in their means of offence and defence, and in the discipline necessary to construct the great works he had been speaking of.

NEW BOARD SCHOOL, OBAN-STREET, TOWER HAMLETS.

AMONG the more recent schools erected by the School Board for London from the designs of Mr. Edward Robert Robson, F.S.A., several changes have become apparent. One is a tendency to increase the size of each school, so that it shall suffice for a larger district and greater number of children, as well as be more economical in management. The question is whether they are not, in some instances, even too large. Another is the adoption of a unit of sixty for class-rooms, capable (where there is no hall) of subdivision into two thirties for the use of pupil teachers. A third is a closer attempt to light as many rooms as possible from the left of the pupil, as is the later German practice. These two last are conflicting in principle and often irreconcileable.

One of the last instances exemplifying these changes is that of the Oban-street schools, Bromley-by-Bow, now in course of erection, of which our illustrations show the arrangement. The site of the building is peculiar, having one frontage on the level of the surrounding streets, and the opposite frontage, at a much higher level, towards the canal towing-path. Taking advantage of this circumstance, Mr. Robson has raised the whole building on arches, thus forming covered playgrounds underneath, the infants' department being approached by inclined planes. The plan of the school, with its great hall, naturally suggests a Gothic treatment somewhat after the type of the Belgian trade-halls. But the *raison d'être* of School Boards is not in harmony with Gothic, and the result is a style of somewhat curious blending, the Gothic *motif* mingling with the usual treatment which Mr. Robson has rendered familiar in his schools.

It will be noticed that there are two staircases for each department. In each case the height of the schoolroom is divided into two floors of mezzanine, approached from the staircase landings, and utilised as cloakrooms and teacher's rooms. The accommodation is for 420 boys, 420 girls, and 560 infants; or a total of 1,400 children.

The building will be warmed by steam-radiators on Leeds's low-pressure system of 5 lb. to the inch, supplemented by open fires in some of the class-rooms.

The tender for the erection of the building by Mr. S. J. Jerrard, of Lewisham, amounts to 18,244*l*.

The number of new schools erected by the School Board (exclusive of enlargements) now reaches the remarkable total of 270.

HIGH SCHOOL FOR GIRLS, DOVER-STREET, MANCHESTER.

THIS building, which is almost ready for occupation, has been erected under the direction of Messrs. Mills & Murgatroyd, architects, Manchester, on a site containing about 3,500 square yards of land, in Dover-street, Chorlton-on-Medlock. The school has been carried on most successfully for several years, but the premises formerly occupied by it being inadequate for the purpose, larger and suitably arranged premises, of which our illustration shows the principal front, have been erected. The exterior is faced with pressed bricks, with moulded jambs and arches, while red terra-cotta has been largely employed for sills, strings, water tables, and weatherings; this material has been supplied by Messrs. Johnson & Co., of Keymer Junction, Sussex.

The frontage is 146 ft., and the buildings extend to the rear 160 ft. On the left of the entrance are committee-room and teachers' common room on the ground-floor; museum and library on the first floor; and some of the principal class-rooms above. On the right is the dining-hall, 72 ft. by 31 ft., on the ground-floor, and the lecture-room is above it, covering the same area, but having a lofty open-timbered roof. From the entrance a wide corridor extends to the rear, having on one side class-rooms, and on the other dressing-rooms, &c., the water-closets being in all instances separated from the dressing-rooms by an intervening lobby with cross ventilation. The class-rooms number in all twenty-two, and will accommodate some 550 pupils with an allowance of about 17½ square feet of floor space each. There are, besides, a well-lighted drawing-room, 110 ft. long, a laboratory and chemical lecture-room, large covered play-room, and an excellent cloakroom, fitted up with drying-closet, &c., in which wet garments may be satisfactorily dried during the school hours. Kitchens, &c., are placed near the dining-room, but as the establishment is exclusively a day-school, no sleeping-accommodation has been provided. The committee, however, which, by the way, we may mention is composed of both ladies and gentlemen of position in Manchester, possesses some 1,500 square yards of land to the left of our view, on which any extension that may be desirable can hereafter be carried out. Messrs. W. Southern & Sons, of Salford, were the builders.

DESIGNS FOR DATE TABLETS.

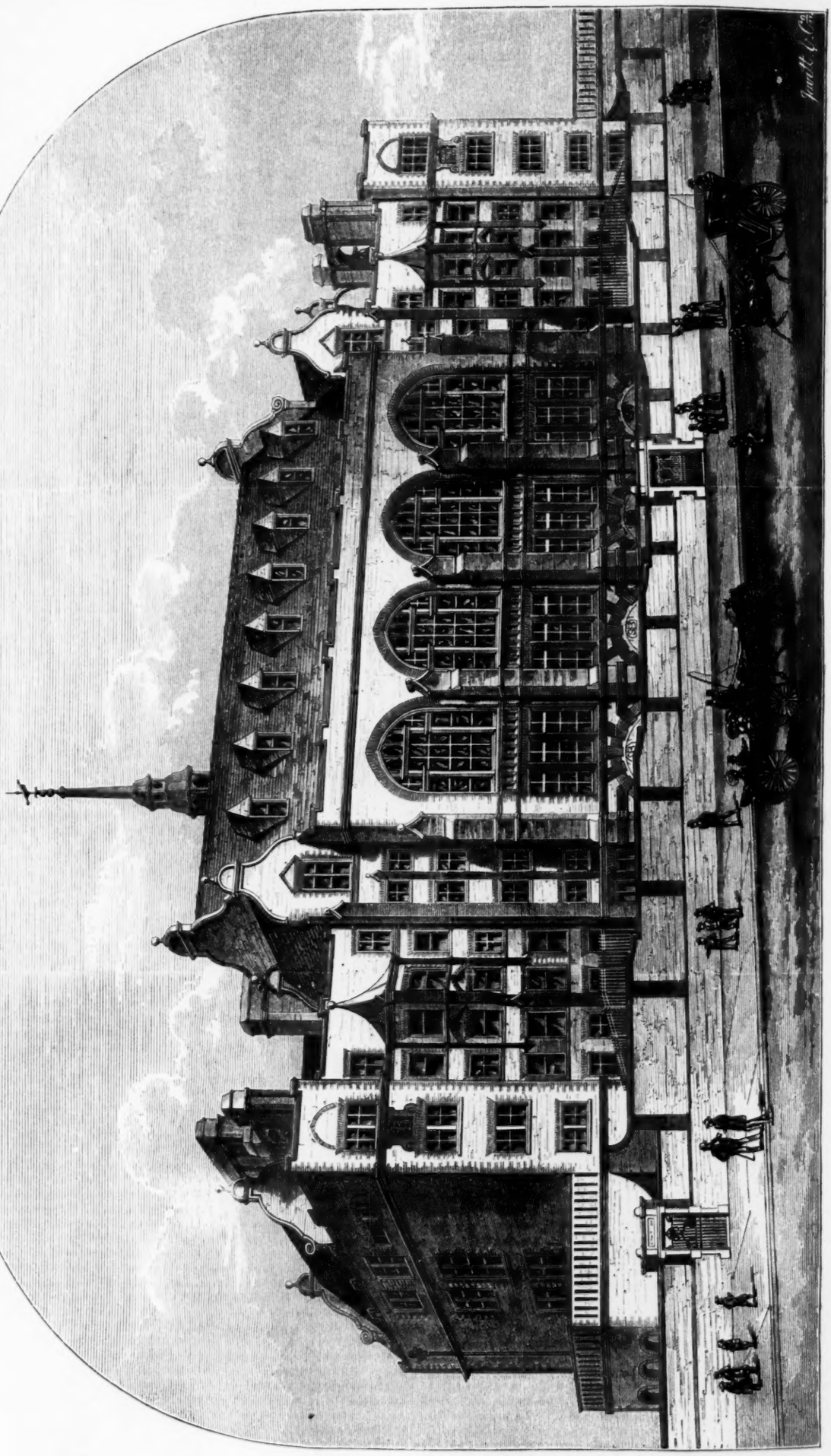
THESE designs for carved date tablets could be used for stone, brick, terra-cotta, or wood, with more or less of detail, according to the material in which they might be carried out. Of course, it is understood that the highest finish would be given when used in wood, and the drawings published are finished up for their use in that material, which, when in position, will be for interior work, and therefore not only nearer the eye, but removed from the damaging influence of the elements. In this case, as they would be chiefly used for small panels in furniture, over mantels, doors, &c., they would seldom be required larger than 6 in. or 8 in., and for general use would probably be of smaller dimensions. But for stone and brick they would very seldom be less than 10 in. or 12 in., and require much less detail, being carried out in a bold and free handling. As they would be seen from a distance, all delicate work would be lost, and, moreover, soon rounded off, by exposure to the changes of our climate.

Some short time ago, while passing a row of well-built detached houses in the modern Queen Anne style, it was seen that the date tablets on each house, although well carved and placed in a most conspicuous position, were all alike; and the question arose where the advantage lay in repeating this hand-work.

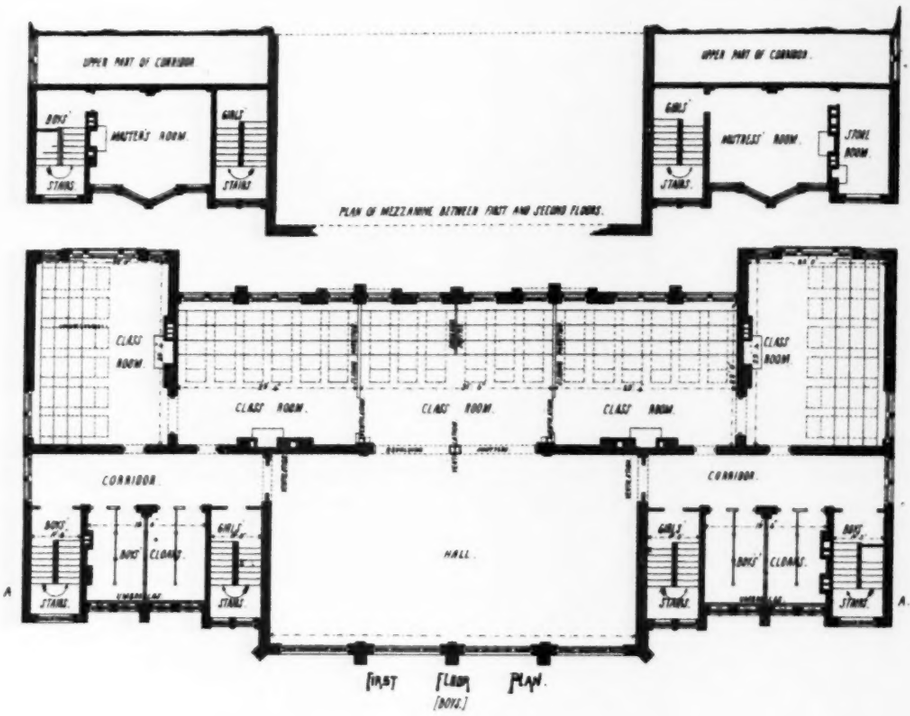
We talk a great deal of the care and spirit infused into the old work, and, while condemning our own workers of to-day, seem to forget that those old workers repeated very little in comparison to the change of design they carried out; while, on the contrary, it is quite the exception for the mason or smith of our time to have anything to do but a constant repetition of a few accepted forms. Can we, therefore, justly complain if he becomes an indifferent machine?

Mr. Lewis F. Day wrote some time ago an interesting article, showing the reasons why a man's house is less his home than it should be. He confined himself to interior decorations and their influences, but we cannot help thinking that our architects can help us quite as much outside as we can help ourselves inside in making our houses our homes, and creating proper pride of possession. If we seek a reason, and one quite outside the question of art or good taste, which are synonymous, is it not a very pardonable vanity in Brown to wish his house somewhat different to Smith's?—a desire for it to possess some individuality, trifling though it may be?

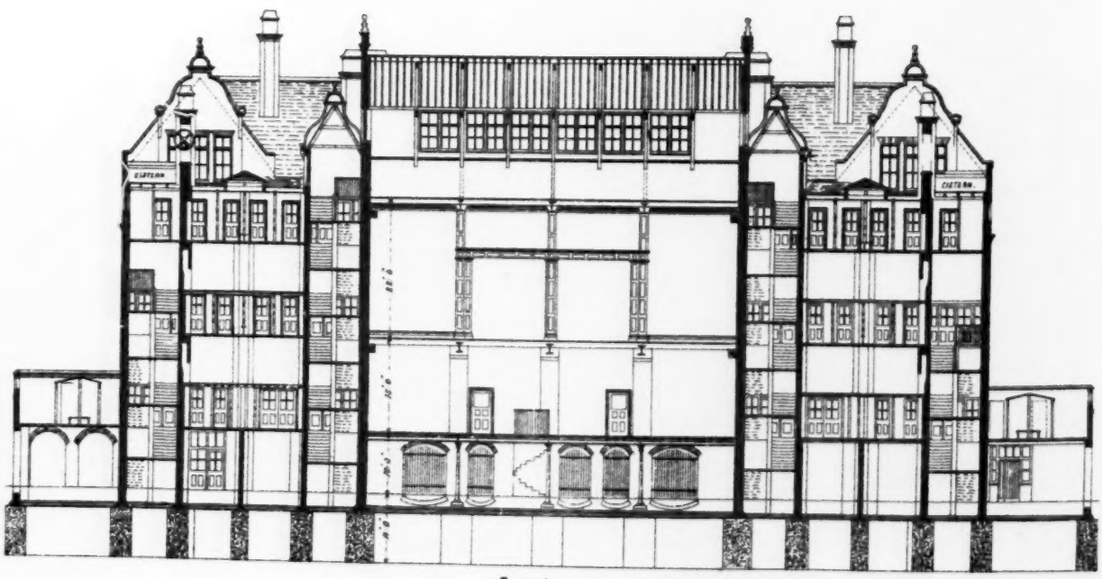
As regards the architectural fabric itself, the actual building, one must perforce accept the inevitable with the best grace possible, if we do not possess the means of indulging in a house built after our own heart; but there are little accessories which go to complete a building, and give it character, as in the fan-light, wherein thought of the future occupier might



OBAN STREET BOARD SCHOOL, TOWER HAMLETS.—MR. EDWARD ROBERT ROBSON, F.S.A., ARCHITECT.



FIRST FLOOR PLAN. (BOYS.)

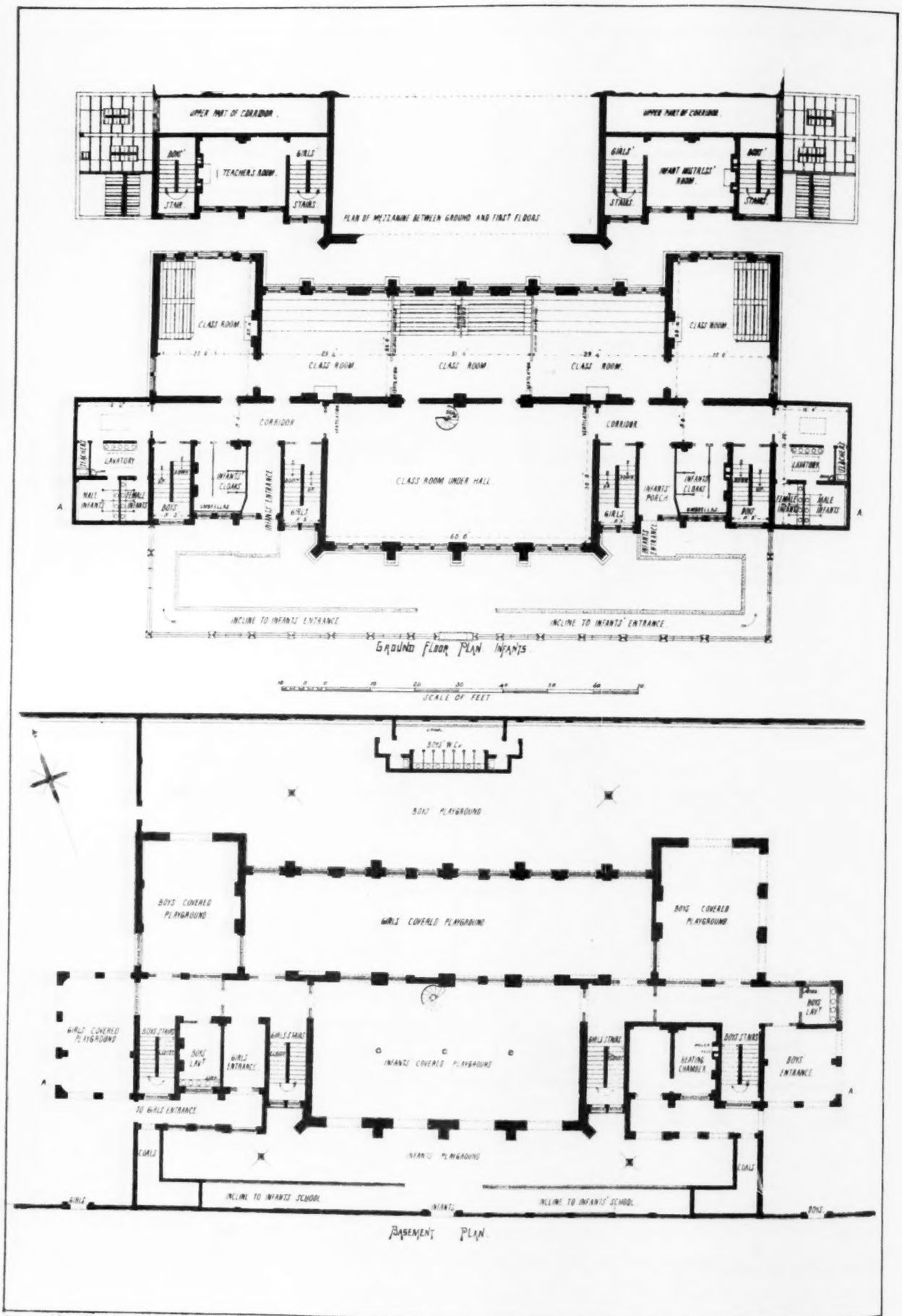


SECTION. AA

Whiteman & Bass, *Photo-Litho* 236 High Holborn.

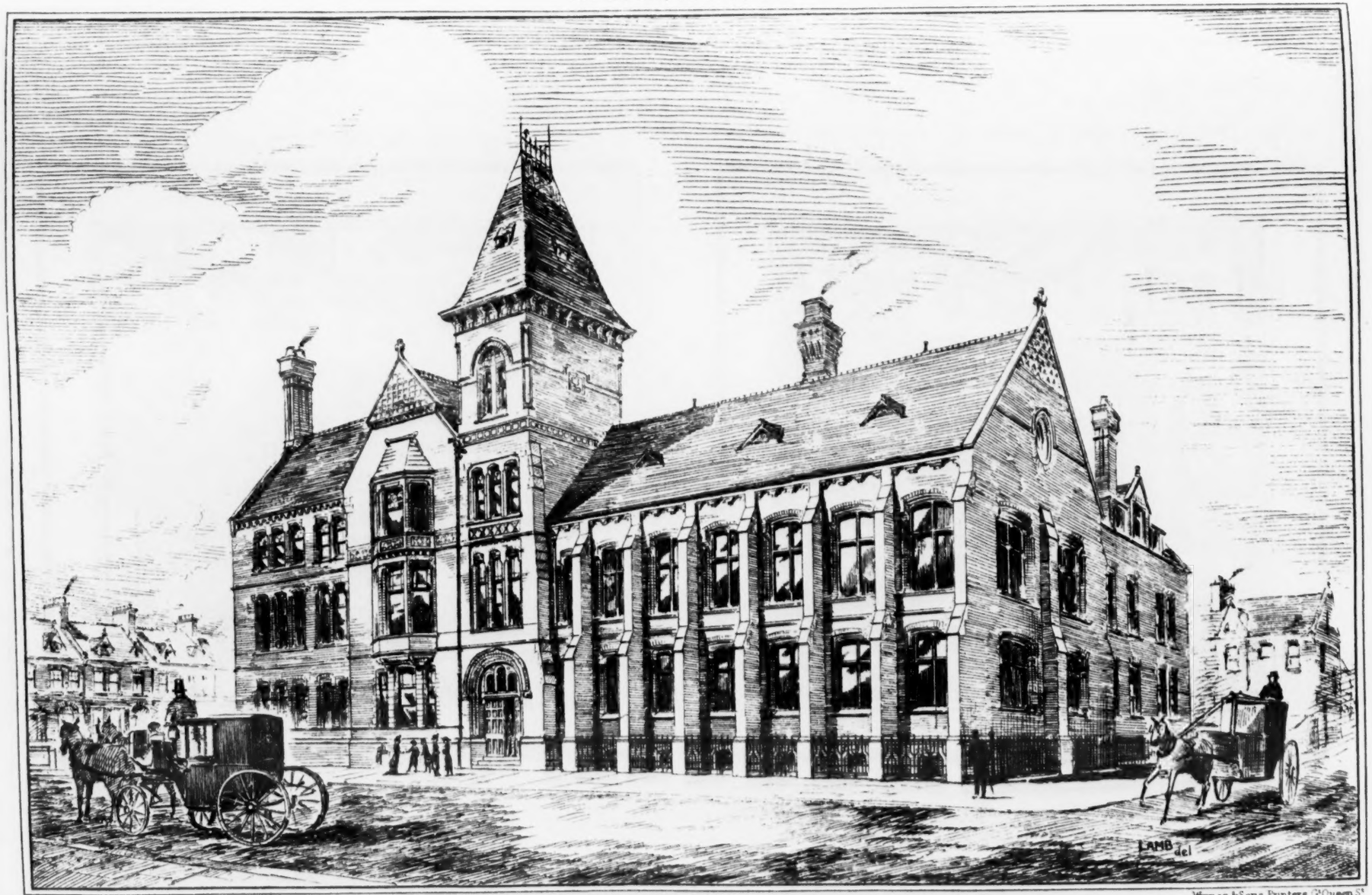
Wyman & Sons, Printers, 74 Queen St.

OBAN STREET BOARD SCHOOL.



Wyman & Sons, Printers, 74 Queen St.

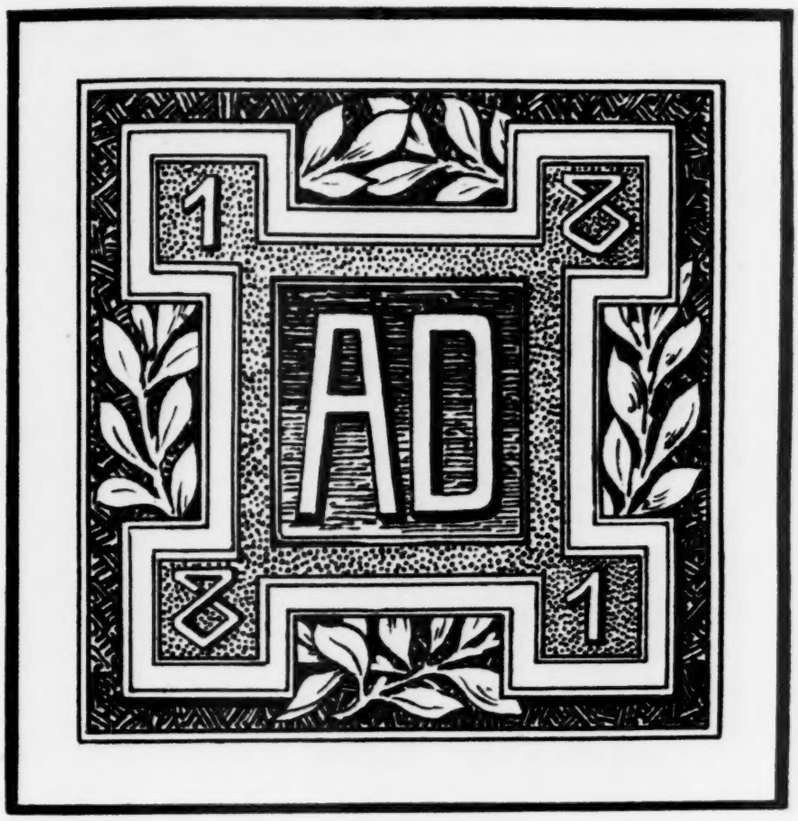
OBAN STREET BOARD SCHOOL.



C. F. Kell, Photo-Litho, Castle St Holborn.

HIGH SCHOOL FOR GIRLS: DOVER-STREET, MANCHESTER.—Messrs. Mills & Murgatroyd, Architects.

Wyman & Sons, Printers, 74 Queen St



C.F.Kell, Photo-Litho. Castle St Holborn, London, E.C.

Wyman & Sons, Printers, Great Queen S

DESIGNS FOR DATE TABLETS.—By Geo. Chas. Haite.

A STREET IN ROTHENBURG, GERMANY.

well be considered. The breaking-up of the door, the date tablet, the small stained-glass window over the porch, the grille in the gate, &c., these need not surely be all alike, and thereby the end and aim almost of their adoption defeated. The expense entailed would be small, and chiefly for the designs.

A STREET IN ROTHENBURG, GERMANY.

In the references we frequently have had occasion to make to the very interesting ancient town of Rothenburg, we have chiefly confined our remarks to the general aspect of the place, to the most perfect system of ancient fortification to be seen there, and to the churches. We now propose to say a few words about the domestic architecture.

Although Rothenburg does not present to our notice any very early example of civil or domestic work, yet the specimens of the latter are very numerous, and far from uninteresting. The illustration which we give of a street in the town includes several interesting peculiarities. The treatment of the lofty gable of the house shows that the roof has been intended for a store-place or warehouse, and the doors for the admission of goods are treated in a remarkably ornate manner. We find amongst the enrichments that bold treatment of the pelleted cable moulding which is one of those singular recollections of Romanesque detail never quite abandoned by the Germans. We also see the interpenetrating cusps, a feature peculiar to late German work. The charming little angle oriel, or, as the Germans call it, "esker," at first appearance seems to belong to a somewhat later period, but in all probability it is of the same date as the rest of the building. It is very interesting from the fact of its retaining its original glazing and tiled roof. The tiles are glazed, and are green, yellow, and red in colour. There is a somewhat marked absence of sculpture about the old houses in Rothenburg, which will be at once noticed in the example we give. This probably arose from the fact that the town, which was one of the "Cities of the Empire," adopted the faith of "the Augsburg Confession" at an early period.

The apse shown in the distance in our view is the western choir of the great Church of St. James. This choir is raised up many feet above the nave of the church, and forms a kind of western gallery. At present it is used as an organ gallery, but probably before the Reformation it was furnished with regular choir-stalls, with an altar, arranged basilica fashion, as we see in the cathedrals of Augsburg and Naunberg. These western choirs are peculiar to Germany, and probably led to the western choirs and organ galleries which became common over the whole of Northern Europe in the seventeenth and eighteenth centuries.

SANITARY PROGRESS.

SIR,—I should be glad if, for the information of those engaged in sanitary works, you could find room for this revised copy of a letter of mine showing some of the economical results obtained by them:—

The extent of the excellent papers, and of the discourses on purely medical or curative science at the International Medical Congress, precluded more than very slight attention being given to sanitative or preventive science, and prevented a notice of the means of the reduction of a percentage of sickness or death-rate by it, or by curative science. Since the congress was held the report of the Local Government Board has appeared, and contains a statement of the progress of sanitary work in England and Wales, to which public attention may now be well directed both in justice to the subject and to the services of the new local health officers appointed, and acting, as yet, with very imperfect attributions and functions. The statement of the report is as follows:—

"Before concluding the part of our report which relates to sanitary administration, it may be useful to draw attention to the annual death-rate for some years past as indicating the effect which recent sanitary measures would appear to have had upon the public health.

The following table shows the death-rate for each of the four last decennial periods:—

England and Wales.

Annual Death-rate per 1,000.	1841-50.	1851-60.	1861-70.	1871-80.
All causes	22·4	22·2	22·5	21·5
Seven zymotic diseases	—	4·11	4·14	3·36
Fever	—	0·91	0·88	0·49

From the above figures it will be seen that, speaking generally, the death-rate of the country remained stationary from 1840 to 1870, but that in the period 1871–80 it fell from 22·5 (of the previous decade) to 21·5, a reduction equivalent to nearly 4½ per cent. It may, therefore, be roughly estimated that about a quarter of million of persons were saved from death in the ten years 1871–80, who would have died if the death-rate had been the same as in the previous thirty years. If twelve cases of serious but non-fatal illness be reckoned for every death, it follows that about 3,000,000 persons, or over one-ninth of the whole population, have been saved from a sick bed by some influences at work in the past decade, which had not been in operation previously. The case, indeed, is still stronger than this. The death-rate of rural districts is habitually lower than that of urban districts; and as the population is steadily concentrating itself, more and more, into the towns, the death-rate of the whole country would tend to increase, if the other circumstances affecting it remained the same. When we find that this tendency has been so much more than merely counteracted, it becomes interesting to see where the gain has been; and to endeavour to trace some of the causes to which it may be due.

Comparing, then, 1861–70 with 1871–80, it will be seen from the foregoing figures, that of the entire reduction of 1·0 in the death-rate, more than three-quarters (4·14—3·36=0·78) comes under the head of 'The Seven Zymotic Diseases'; of the diseases, that is, which are most influenced by sanitary improvements, and most amenable to control by the action of sanitary authorities. And of this three-quarters just half (0·88—0·49=0·39), or three-eighths of the entire reduction, is in 'Fever,'—the disease which, more than any other, shows itself in connexion with such faults of drainage, of water supply, and of filth accumulation, as it is within the province of good sanitary administration to remove.

It is particularly significant that, since the year 1870, when the fever death-rate was 0·80 per 1,000, it has fallen pretty steadily, year by year, as follows, down to 0·32 in 1880:—

1871	·70	1876	·44
1872	·61	1877	·41
1873	·58	1878	·42
1874	·59	1879	·30
1875	·55	1880	·32

Thus in the five years, 1871-5, the fever death-rate was 0·61; in the five years 1876-80 it was 0·38."

During the decade from 1861 to 1870, there appeared to be no gain from the outlay on sanitary works or on sanitary service in England and Wales; but since then the service appears to have made an effective start, and the pecuniary gain may be thus stated:—Under the inquiry as to interments, the cost of funerals,—all round,—was ascertained to be 5*l.* each. The gain under that head will, therefore, be about one million by the quarter of a million of funerals saved during the last decade. The direct cost of sickness has been estimated at about 1*l.* per case. The gain under that head during the decade will, therefore, amount to about three millions; a gain, that is to say, of medical treatment and other expenses. But the gain to the wage classes, from the saving of lost labour, will have been far greater. Dr. James Watts, who has had great experience in friendly societies, states the average loss of working time at two working weeks and a half per member between twenty-one and seventy years of age, and he estimates the total loss to the wage classes, by the loss of work through sickness, at upwards of thirteen millions per annum. The gain derivable from sanitation may be further illustrated from its advance in military service. The first British army went out to the Crimea under the established curative or medical service, and it was lost. Sanitary Commissioners, trained in service under the first General Board of Health, were then sent out to reform the condition of hospitals and camp, and within three months reduced the sickness and mortality from a plague-rate down to an ordinary standard of health, and by the end of the summer of 1855, to a rate lower than that of the best hospitals at home; and the War Minister declared in Parliament that by the application of their science the second army had been saved. Since then, the Army Medical Department has applied extended sanitary operations. Their exercise under great difficulties is best shown in India. Formerly the death-rate in the Indian army was 69 per 1,000 per annum. The average mortality from 1869 to 1878 was only 20·41. There was, therefore, a gain of 48·59 per 1,000; or, on the present force out there, a gain of 2,350 men. The death-rate of the army at home was formerly 18 per 1,000. In the year 1879 it was 7·55, being a gain of 10·55 per 1,000. As the strength of the army in 1879 was 80,700, the gain was 843 per annum. The total gain to the army in India and the army at home, and the rest of the army, will be 3,443 men per annum. As each soldier is estimated at 100*l.*, this represents in money value 344,000*l.*, or more than a third of a million. It is not very easy to get at the real amount of the sickness, but the total gain, including the diminished death-rate, is considered to be under-rated at half a million per annum.

The total number of men killed on the battle-field and on the deck, including those killed at Waterloo, Trafalgar, and the most severe battles during the twenty-two years' war, was, according to the Army returns, 19,796. The lives saved from premature destruction by the civil sanitary service, during each of the ten years of the decade, was 25,000. The wounded during the twenty-two years' war were 79,709; but, taking a serious sickness as equivalent to a wound, the achievement of the sanitary service has been, during the same period, some three millions of cases saved by the civil sanitary service. The deaths by steam explosions, in mines and on railways, amount to about five thousand annually, but the lives saved by the civil sanitary service in England and Wales are five-fold greater than the lives thus destroyed by civil accidental violence. A reduction of the death-rate by 4½ per cent. is only an instalment of sanitary progress. Thus, in the instance of Croydon, visited by the delegates of the Congress, the death-rate has been reduced from 25 to 16 per 1,000, chiefly by the methods introduced by the first General Board of Health, by which spring supplies of pure water are carried into the houses, and the fouled water carried at once out of the houses and out of the town, by one Local Board authority, while all putrescible matter, instead of remaining for months and years in conditions of putrefaction, is undecomposed, and flows upon the land within two hours. So in Salisbury, Leamington, and a number of other places. At Croydon, it has been stated by Dr. Alfred Carpenter that, by complete sanitation, the death-rate might be reduced to 10 in a thousand. In the metropolis the death-rates amongst the wage classes in their common dwellings is upwards of 30 per 1,000. In the model dwellings in London, it is, however, about 16 or 17, even with surrounding deteriorating conditions. On the demonstrations of various model instances, it may be held that the reduction of the general death-rate by 4½ per cent., as reported, satisfactory as this is, cannot be considered more than one-third of the results obtainable by advanced sanitary administration and further sanitary works. The pain and misery, and the social disorder, occasioned by excessive sickness and premature mortality, are generally beyond pecuniary estimation. Such estimates as those given serve to show the money loss incurred, by inattention to the continuance of preventible physical evils.

EDWIN CHADWICK.

THE NEW INFIRMARY AT BOLTON.

THE new Infirmary at Bolton, opened on the 5th inst. by the Earl of Bradford, is at present the scene of an important exhibition of fine art. On the occasion of the opening, Mr. T. H. Winder (one of the hon. secretaries) submitted a report showing the origin and progress of the scheme for the erection of the new buildings. Practically the scheme originated in March, 1879, when, at a meeting of the subscribers, the Rev. Canon Powell intimated that he was authorised by a gentleman who desired his name to be kept secret to offer 5,000*l.* towards the endowment of a children's ward in connexion with a new infirmary. The anonymous donor proved to be Dr. S. T. Chadwick. At the same meeting another munificent contribution of 5,000*l.* was offered by the firm of Messrs. John Musgrave & Sons, of which the present mayor is the head. The old infirmary, in Nelson-square, was partially erected in 1824, at a cost of 1,300*l.* In 1838 and 1864 it was enlarged at considerable cost, the most recent of these additions being the construction of another story. Originally the institution was purely a dispensary, but from 1838 the institution included in its benevolent operations the purposes of an infirmary as well as a dispensary. As the old infirmary had been known for many years to be inadequate for the needs of the town and district, it was decided in 1876 to venture upon the establishment of a new infirmary and dispensary. A site forming part of the Bridge House Estate, adjoining the public park, and containing about 23,300 square yards of land belonging to the Ecclesiastical Commissioners and the Earl of Bradford, was secured on favourable terms, and competitive designs were obtained and exhibited to the general public. The committee submitted the designs to the judgment of Mr. Charles Barry, the then President of the Institute of British Architects, who recommended the first premium to be awarded to Mr. R. K. Freeman, of Bolton and Derby, who was accordingly selected as the architect of the new infirmary. The private donations, paid or promised, obtained through the instrumentality of the general committee, from the gentry and tradesmen, including about 7,300*l.* on endowment account, amount to upwards of 33,000*l.*, whilst by the devoted labours of the working men's committee, upwards of 1,300*l.* has been realised from the operative classes towards the new institution, in addition to 676*l.* produced by the Hospital Saturday collections in May last towards the working expenses of the infirmary. In May, 1880, the late Mr. Selim Rothwell suggested to the New Infirmary building committee the advisability of holding an exhibition of works of art in the new institution and in aid thereof; similar exhibitions in aid of the dispensary in 1850 having been very successful. Mr. Rothwell pleaded earnestly for a repetition of the experiment on an enlarged scale, and his proposal having been favourably entertained, a fine art committee was constituted. The committee commenced their labours by securing the patronage of members of the nobility, besides the gentry of the town and neighbourhood, and in order to establish a feeling of security and provide against any possible loss, a guarantee fund of nearly 2,500*l.* was subscribed for by those interested in the movement. The work of soliciting loans of pictures from collectors and artists then commenced in earnest. At first the promises of support were tardily given, but by degrees, through the constant exertions of Mr. Rothwell and several members of the fine-art committee, the numbers gradually increased until the middle of July, when upwards of 1,000 were entered as ready to be delivered to the exhibition committee. The work of collecting commenced on or about the 28th of July last, and by the 8th of August so many paintings had arrived that the committee determined to commence the selection and hanging at once. The collection obtained consists of about 1,600 paintings,

etchings, engravings, pieces of sculpture, and bronzes, which have been hung and arranged in thirty-one rooms and five corridors, and although some of the rooms are small and others not well lighted or adapted for such an exhibition, it is believed that on the whole the most has been made of the resources of the building. In addition to the above, the committee have been successful in obtaining the loan of collections of art pottery, coins, ancient armour, and a splendid collection of articles contributed by Messrs. Elkington & Co. The Science and Art Department, South Kensington, have also lent a valuable and interesting collection of objects of art in six separate cases, containing specimens of enamels, porcelain, carvings in wood and ivory, and a variety of Indian and Spanish textile fabrics. The committee have been successful in obtaining probably the best collection that has been exhibited in the neighbourhood since the memorable Art Treasures Exhibition in Manchester in 1857. It is to be hoped that it will not only be a pecuniary success, and so of help to the Infirmary, but that it may prove of lasting benefit in the development of a more appreciative taste for art.

THE PATENT LAWS.

THE SOCIETY OF ARTS' PATENT BILL.

SIR FREDERICK J. BRAMWELL, F.R.S., brought forward this subject at York. He said, after giving a history of the Bill,—The need of a patentee in the development of an invention was the first point the committee kept before them. The second point the committee had in view was that, so far as possible, the connexion between lawyers and patents should be severed. There can, I think, be little doubt that whether in regard to the original granting of patents, or in regard to their amendment, or in regard to the trial of patent actions, lawyers are the persons least adapted to perform these functions properly. No one entertains a more sincere respect than I do for the Bench and the Bar of England, and I wish, in the interests of that respect, to see them discharged of functions which most certainly they ought never to have had thrust upon them. Fortunately, having regard to the magnitude of the transactions involved in patent matters, there is but very little patent litigation. In the year 1874 it was ascertained for me that there were, upon an average, only nine patent actions which went so far as to be heard by a Court of First Instance in each year, and I have no reason to suppose that that number has materially increased, if, indeed, it has increased at all. But with respect to the few actions that are tried, a very considerable part of the expense arises from the elaborate models which are needed to instruct counsel upon the subject, who themselves have to inform both the court and also the jury, where there is one. And further, commonly, notwithstanding all the expense that has been gone to, and the pains that have been taken, the litigants have the chagrin of seeing that they have not been successful in making themselves understood either by the court or the jury, or, it may be, not even by their own counsel. The first proposition of the Bill is that there should be appointed, in lieu of the present Commissioners, who are all legal officials, a body of commissioners, one of whom should be well acquainted with engineering, one with chemistry, and one with law. Power is given to the commissioners, with the approval of the Treasury, to appoint the needful staff. It is intended that these commissioners should be the persons to grant patents, after a slight examination by examiners, not as to novelty, not as to utility, not as to sufficiency of invention, but simply to ensure that the necessary forms are complied with, and that a sufficient description is given. The commissioners, also, are those who would hear opposition, which it is proposed to confine to those persons who allege that the invention has been fraudulently obtained from them. They are also those who would consider as to amendments, and as to prolongations; and it is intended that both amendments and prolongations should be made more easy than they are at present. And, finally, it is the commissioners who would hear patent causes. This remitting to the commissioners of the trial of patent causes, probably is the most thorough change made by the Bill. Among the other provisions, the procedure has been modified, with the object of helping the patentee to obtain his patent more easily than at present, and more cheaply, and also with the object of rendering the patent more secure when he has once obtained it. The committee who framed the Society of Arts' Bill are of opinion that it is contrary to the interests of the public that a patentee should be deprived of his invention by what, after all, are technicalities. Further, it is a very common thing for a patentee to obtain provisional protection, and having done so, either through being too much occupied with other matters, or through being incompetent to develop his own ideas, to abandon the further proceeding with the patent, and to allow his provisional protection to lapse, and thereupon the provisional specification is made public. I believe I am right in saying that something like 30 per cent. to 40 per cent. of all the inventions for which provisional protection is obtained do not go beyond that stage. The result is that there is made public, legally speaking, a mass of crude and undigested matter, always useless to the manufacturer, but commonly destructive of the novelty of a patent which might come afterwards and be fully worked out by an inventor. The committee propose that the provisional specification should be a merely temporary document, that it should never be made public, so that whether a patent be granted, or whether the provisional protection be suffered to lapse, the document should be destroyed. Similarly, it appeared to the committee that it was inexpedient a patent should be rendered invalid by any dormant publication, such as a book in the British Museum, and therefore they propose that unless an invention can be proved to have been in use within thirty years, no mere publication, unaccompanied by use, should be considered an anticipation of a patent. With respect to the term of a patent, it will be seen that the committee suggest the American term of seventeen years, coupled with the power of prolongation for a further eleven years. The term of seventeen years has been taken, coupled with this power, in preference to the term of twenty-one years proposed in the Government Bill of 1879, unaccompanied by prolongation, as the committee deemed that seventeen years, if the patent was successful, would afford the patentee sufficient remuneration, and also that having once established a body competent to deal with patent matters, there would no longer remain the difficulty of obtaining satisfactory decisions in cases of prolongation. The scale of fees proposed in order to obtain a patent is that of the Government Bill of 1879, and, as regards the subsequent payments, is practically the same as was proposed in that Bill.

Sir Antonio Brady, president of the Inventors' Institute, said that in his opinion the Society of Arts had done a most excellent work in bringing forward this Bill. He considered that taxation ought to be general, and that the brain-power upon which rested the prosperity and industry of the country should not be overtaxed. The Patent Law of America should be more their guide, and the Office should be made to render assistance to inventors. At present the register was so imperfectly kept that there was a difficulty in ascertaining when inventions had been patented, and provision ought to be made for preventing inventors running their heads together and going to law. If the proposed Bill were passed it would be impossible for two men to get a patent for the same invention in one day. The Bill was one that would recommend itself to the Inventors' Institute, and he should avail himself of an early opportunity of asking them to take it into their consideration and give it their support. The Society of Arts had done a marvellously good thing in bringing forward this Patent Bill. It is a mistake to think, as some people did, that patents were monopolies. He considered the country was very much indebted to Dr. Siemens for bringing his inventions over here. Although the patent laws of England gave more encouragement and aid to inventors than those of Germany, still they required much alteration. In America a patent was in reality property, but here it was a licence to go to law. In this respect he did not see why it should be different to the copyright law. With regard to the duration of the term of a patent, he did not see why it should not be twenty-one instead of seventeen years. If the Bill became law it would give a great impetus to the trade of this country. He thought the attention of the committee might be called with advantage to the desirability of reducing the fees so as to bring them within the limits of the working man.

Dr. Siemens said the Bill was the result of careful consideration and discussion by the committee, of which Sir F. Bramwell was the chairman, and he thought the best thing would be to take it *en bloc* rather than for the meeting to suggest any minor alterations.

THE SAVOY THEATRE.

THIS theatre, which is advertised to open on Monday, October 3rd, has been erected for Mr. D'Oyly Carte from the designs and under the direction of Mr. C. J. Phipps, F.S.A., architect of the Gaiety, the Haymarket, Princess's, and other theatres. It is situated on the west side of Beaufort Buildings, Strand, and occupies a site absolutely isolated on all four sides, thus affording free and expeditious entrance and exit for all classes of the public. The entrances are thus distributed, and are arranged so as to utilise the peculiar levels of the site.

For the stalls and dress-circle, and for all persons coming in carriages, the entrances are in Somerset-street, just off the Victoria-embankment. The pit is also entered here, and there is an entrance to the upper circle; the audience for both these latter parts can come direct from the Strand, by a short flight of steps adjoining Beaufort House. In Beaufort Buildings also is an entrance to, and on a level with, the upper circle. The entrances before referred to from the Embankment are on a level with the dress circle, and a few steps lead down to the stalls and pit.

The gallery is entered from Carting-lane, a street in a direct line from the Embankment to the Strand. The royal entrance is at the angle of Somerset-street and Carting-lane. The stage entrance is in Herbert's-passage. The box-office for booking seats during the day is situate close to the Strand, at the angle of the Beaufort-buildings frontage. The manager's offices are also entered from Beaufort-buildings.

The theatre is approached from Somerset-street through a semicircular vestibule, paved with black and white marble, in which are the offices for booking and obtaining seats in the evening. Doorways immediately opposite the entrances lead to the dress-circle corridor, out of which wide staircases will be found on both sides of the theatre leading to the stalls. From this vestibule are also means of communicating by an ascending staircase with the upper circle, and by pass doors to the pit staircase.

All the entrances, passages, and staircases are of fire-resisting materials; the flights of stairs are supported at each end by solid brick walls, and each staircase has a handrail on each side. There is no part of the theatre that has not two means of both ingress and egress, and the stage is separated from the auditory by a solid brick wall taken up completely through the roof. Water laid on from the high-pressure mains is in several parts of the theatre, and every possible means has been taken to ensure both the comfort and safety of the audience.

On the floor below the vestibule is a large refreshment-saloon for the pit, and contiguous to it a smoking room opening out of the stalls corridor, with a separate boudoir lounge for ladies. There are also refreshment-saloons on the upper floors of the theatre, for both the upper-circle and the gallery, with all necessary retiring and cloak rooms.

The auditory is thus arranged:—On each side of the stage opening (which is 30 ft. wide by 32 ft. high) are three private boxes on each of the three levels; these are divided by partitions and ornamental pillars, and are surmounted by an arch spanning the whole width of the proscenium, springing from a cornice on a level with the gallery front. These boxes are upholstered in hangings of gold-coloured embossed satin. The orchestra is in front of the stage, and is of sufficient capacity for a full band of musicians.

There are nine rows of stalls on the level of the orchestra, seated to hold 150 persons in arm-chairs, with ample space allowed for passing between the several rows, and wide unimpeded gangways on each side to the entrance-passages. Behind the stalls are six rows of pit-seats, calculated to seat 250 persons, with a spacious open corridor behind, for standing and promenading. Above the pit, but at sufficient height to allow of persons at the very back seeing the full height of the scenery, is the dress-circle of six rows of seats, with arm-chairs for 160 persons. There are no pillars of any kind in the dress-circle, so that a clear unobstructed view of the stage is obtained from every seat. Above

the dress-circle, but receding some 9 ft. back from it, is the upper circle, seated to accommodate 160 persons in five rows. The amphitheatre and gallery recede 5 ft. behind the upper circle, and will seat 400 to 500 persons in eight rows. In each tier the balcony-front takes the form of a horseshoe, that being considered by the architect the best adapted for perfect sight of the stage.

The ornamentation of these several balcony fronts is Renaissance in character, and is elaborately moulded and enriched with the figures and foliage peculiar to the Italian phase of the style, and gilded. The ceiling over the auditory takes the form of an extended fan from the arch spanning the proscenium, and is divided into a series of geometric panels modelled in Renaissance ornament in relief, of the same character as the box fronts. Colour is sparingly used in the ceiling, the background of the ornament only being painted a pale yellow. The proscenium arch is divided by ribs into a series of panels, with gilded ornament. Over the proscenium, in the tympanum of the arch, is a *basso-relievo* of figures and ornament upon a gold ground. The walls of the auditory are hung with a rich embossed paper, in two tones of deep Venetian red. The seats are covered in peacock blue, plush being used for the stalls, and stamped velvet for the dress-circle. A gold-coloured satin curtain takes the place of the usual painted act-drop.

The stage, which is laid with all the latest improvements in mechanical contrivances, is 60 ft. wide by a depth from the float lights to the back wall of 52 ft.; there is a clear height above the stage of 56 ft. for the working of the scenery, and a sink below of 15 ft. Behind the stage, and occupying the whole wing of the building in Herbert's-passage, are the dressing-rooms and offices of the management.

The theatre is fitted with a complete system of gas-lighting, but this is only for use in case of emergency, the whole of the illumination for all parts of the establishment being by means of electricity; this has been undertaken by Messrs. Siemens & Co., and the lights adopted are those introduced by Swan, of Newcastle, and known as the "Swan Incandescent Light," the power necessary to generate the electric current for so many lights being supplied by powerful steam-engines placed in a separate building on the vacant land adjoining the theatre. These "Swan" lights are of a beautiful colour, and in no way impare the atmosphere of the theatre, and emit no heat; they are not of the piercing brightness of the electric light as seen in the streets and elsewhere, and, therefore, are not unpleasant to the eyes. This is the first instance of a public building being lighted permanently in all its departments by the electric light.

The exterior façade of the theatre is in Somerset-street, facing the Victoria Embankment, and both this and the Beaufort-buildings frontage are built of red brick, with Portland stone for all moulded parts, and are Italian in style.

The contractors who have been engaged upon the works are as follow:—

Patman & Fotheringham, for the whole of the builders' work, including the stage. Collinson & Lock have arranged the scheme of colour for the interior, and have executed the papering, painting, and gilding, and have supplied the upholstery and carpets; they have also modelled and executed the plaster ornamentation, in conjunction with Geo. Jackson & Sons. Strode & Co. have fitted up the gas arrangements. C. Wadman has manufactured the armchairs for the dress-circle and stalls. Burke & Co. have laid down the marble floor of the vestibule. C. Drake & Co. have executed the concrete floors and staircases. Faraday & Son have made the internal fittings in connexion with the electric lighting. Merryweather & Sons have supplied the fire-hydrants and other such appliances. Clark & Co. have constructed the revolving iron shutters and blinds at entrances.

Mr. J. E. Walker has been the architect's clerk of works.

The Town of Swansea has lately decided on filling the east window of St. Mary's Parish Church with stained glass, to commemorate the meeting of the Church Congress held there in 1879. The subject chosen is "Christ's Sermon on the Mount," and the execution of the work has been entrusted to Messrs. Mayer & Co., of New Bond-street.

PUBLIC WORKS AT IPSWICH.

IN addition to the public works lately described by us as having been carried out at Ipswich, we may usefully give some particulars of the new sewerage works, and of the new hospital for infectious diseases, both recently opened.

The Sewerage Works.—Ipswich has for many years been regarded as in an almost dangerous state, on account of a deficiency or absence of sewerage works. This was not only inconvenient, but the death-rate of the borough has, it is said, been higher than it should be, and considerably higher than it would be if proper drainage had been provided. This is a question upon which many years' consideration and discussion have been expended; and, indeed, it is just a quarter of a century since the Corporation began to talk of providing a sewerage system at Ipswich. Mr. Bruff was the first engineer consulted, and he drew up the very scheme which has now been adopted in substance, after consideration of a rival scheme for sending the refuse of the town on to a sewage farm on Nacton Heath. Part of Mr. Bruff's plan was to construct an intercepting sewer along the low-lying parts of the town to the river, at the Cliff Bight, and thence along the foreshore, past Hog Highland to the London Hard. Tenders were advertised for for the execution of the works, and Messrs. Pearson & Son, of Broomfield Works, Bradford, were the successful competitors. Messrs. Pearson at once set about the work, and in October, 1879, a commencement was made in the bed of the tail stream of the Gipping, at its commencement near Bird's Gardens. That tail stream (says the *Ipswich Journal*) had long been an abomination and an eyesore to the people of Ipswich; it conveyed a stream of filth and refuse to the Orwell, and was usually stigmatised as the open sewer, —a name which it well merited. The sewer here was 4 ft. by 4 ft., and far greater difficulties were met with in this part of the plan than had been expected. A thin deceptive crust had been formed, and it was found when the work was commenced there that the bottom was so rotten that much expenditure was needed for concrete, piles, &c., to fill up the great holes, in which were then only foul, oozy mud. Soon after the works had been commenced at this end, the outfall works were begun at the other extreme of the sewer, and here again the variable nature of the soil, and the depth of the ooze, greatly increased the difficulties beyond what had been expected, and the result was that it was not until some time after the rest of the sewer had been completed that the outfall works were ready for use. A portion of the site of the works had to be reclaimed from the foreshore of the river, and the depth of the ooze rendered this a work of considerable difficulty, as it absorbed large quantities of the earth which were thrown upon it to make the embankment. However, the embankment was completed in about six months, and the making of the sewer from that end was then proceeded with. No fewer than 400 men and 30 horses were employed upon the works, which made rapid progress, and the two ends of the sewer began to approach rapidly towards their point of union. The sewer is carried past the Greenwich Farm, along the foreshore, through the shipyards, past the Ship Launch Inn, and thence straight past the Gas Works. Thence it passes through St. John-street and Duke-street to the Fore Hamlet, into Fore-street, along which it was carried until it reaches Salthouse-street, and the works were then carried through into Key-street, past the Custom House, into College-street, across St. Peter's-street, into Grey Friars-road, and then through Mr. Cole's to the bed of the old Gipping tail stream, where it met that part of the sewer which had reached that spot from the upper end. The whole line of the sewer was thus completed last Christmas. The entire length is 2¼ miles, and its size is increased towards the lower end from Lower Orwell-street, where it is 5 ft. by 5 ft., until it reaches the outfall works, at which point it is 11 ft. high. Almost the whole way along its route great difficulty has been caused, owing to the nature of the soil, much of it, even in the town, having been formerly subject to the influence of the tides, and it has been necessary to strongly shore up its side with timber for the safety of the houses on each side. The soil has generally been sand and gravel, and on the foreshore there has been ooze or slob to contend with. John-street was the only part of the work where the contractors had a continuity of strata of any length, but there there were still greater difficulties to be dealt with; and all through, the variable and bad quality of the soil, with frequent presence of water, threw great difficulties in the way of the undertaking. All the old sewers met with in the work were carried into the new sewer, and a temporary outfall was made near the Greenwich Farm to discharge the sewage while the outfall works were in progress. The outfall works were not completed until some time after the sewer, and the great difficulties which were met with there caused that work to be longer in hand than the rest. The outlet is 4 ft. above low-water mark; therefore, the water will have to stand and collect for a considerable part of the day in two reservoirs which have been constructed to receive it. The outlet to the river will be closed to keep out the tide, and five hours per day will be ample time for the discharge of the sewage of the town. The sewer will collect the refuse for the greater part of the day, and discharge it into the river when the tide is two-thirds ebb. The sewage first flows into a large brick chamber through a sluice-door or penstock, and round this chamber are various other penstocks leading to different parts of the works. Two of the penstocks will admit the sewage into the two large brick underground reservoirs. Each of these vaults is double-arched along its entire length (450 ft.), and each one is capable of holding 600,000 gallons. Here a great deal of the solid matter will settle, and the liquid will be poured from it to the river, but the best account to which to turn the sludge which will be left is a problem which as yet remains to be solved. Adjoining these covered reservoirs are two large tanks, each made chiefly of concrete, the larger of which will hold 1,000,000 gallons, and smaller 750,000. All rainfall will find its way to these works, and these two tanks are constructed solely for the purpose of providing for any extraordinary flow of water that may be thus caused. Messrs. Pearson & Son have fully carried out the provisions of their contract. Mr. H. Miller, jun., assistant to Mr. Bruff, superintended the progress of the whole work, and supplied all necessary lines, levels, &c. The contractors estimate that in the course of the works 130,000 cubic yards, or 200,000 tons, of earth, have been excavated. Over 6,000,000 of bricks were used, and of these 2,000,000 were made by the contractors at the outfall works from a vein of brick earth which was excavated there during the execution of the works, and which proved a most useful find to the contractors, who turned out 30,000 bricks per day. The rest of the bricks were brought by water from Yorkshire, at a cost of over 10 per cent. above those of ordinary local bricks. Three thousand tons of cement were used, and this was supplied by Messrs. J. R. Pattrick & Son, of Dovercourt.

The Infectious Diseases Hospital.—This building, opened on the 18th ult., is situated on a large piece of ground recessed some distance from the Foxhall-road, a short distance past the Borough Asylum. It has been erected by Mr. Richard S. Smith, of Northgate-street Works, from the designs of Mr. E. Buckham, the Borough Surveyor, in consultation with the medical officer of health, Mr. G. S. Elliston, and under the immediate supervision of Mr. C. Cullingham and Mr. N. Catchpole, two members of the Health Committee. Although the main consideration has been to provide buildings adapted for the treatment of patients in the most approved manner, the buildings have some architectural pretensions. They are in a style which may be described as a modest kind of Domestic Gothic, and consist of four blocks,—a central block and three blocks to the east, west, and north, connected with the central block by covered ways, open at the sides,—the three outer blocks being thus completely isolated from each other and from the central block, which is devoted to the administrative department. The buildings are of red brick, with Portland stone dressings. The administrative department includes rooms for the porter in charge and for other purposes; there being two sitting-rooms, kitchen and scullery, with store-room, larder, and other closets, including a wardrobe for the keeping of patients' clothing during the time they are in hospital. On the first floor are four spacious bedrooms, so that if a resident medical officer became necessary during an epidemic, rooms could be provided for him, or for night nurses if it became necessary to have a relay of nurses. The three covered ways radiate from the central building to the outer blocks. The complete

isolation of each block makes it possible to treat three kinds of infectious disease in the hospital at the same period. In each block two wards,—male and female,—are provided, each containing four beds. The nurses' room is between the wards, having a window affording a view of each, a stove at which minor cooking operations might be conducted, and a store-room in immediate proximity. At the end of each ward a door opens to a passage, with doors at each end of it to the open air, and with earth-closet, sink, &c. The interiors of the wards have a very cheerful appearance. They are well-lighted from windows on each side, and the walls are lined throughout with white glazed bricks, relieved by buff, brown, and blue bands, the glazed surface of the walls, which is impermeable to moisture, rendering it specially easy to wash them, and remove all traces of infection. The floors are of pitch pine, and the exposed timbers of the roofs, which are ceiled at the plate level, are also of pitch pine, stained and varnished. Considerable care has been taken also with regard to ventilation. Two fireplaces with brick chimneys occupy the centre of each ward, the stoves being Elsey's patent; and, in addition to upright ventilating tubes at the corner of each room, there are ventilating-shafts in connexion with each stove. These, communicating with outer air under the floor, bring in the fresh air, which, being carried through the flues at the back of the stove, is warmed before being discharged into the room. Beneath each bed there will also be movable ventilators for use if required, to admit fresh air. Foul air is intended to find its way out by ventilators in each chimney, immediately below the ceiling, and by a ventilator in the ceiling leading through a pipe to an Archimedian screw ventilator. The size of the wards gives 2,000 cubic feet of air space to each patient, with a floor space of 144 ft. to each, the ample floor and air space thus provided obviating the necessity for a convalescent ward. There being four beds in each ward, and six wards, accommodation is provided for twenty-four patients in all. The contract for the erection of the building was 3,649*l.*, and the extras are not serious. The hospital has the advantage of being built upon a dry subsoil of sand and gravel, and the drainage is disposed of by a system of subsoil-irrigation. It is collected at certain fixed points, and thence distributed by a system of land tile drains, at a depth of about 1 ft. 3 in. or 1 ft. 6 in. The discharge is facilitated by the used of Field's automatic flushing tanks. Besides the main buildings described, there are two detached buildings at the corners of the grounds. One of these contains, in two parts, the mortuary, and a chamber for infected linen. The other building is the laundry and coach-house.

A SEASIDE REFLECTION.

An article in the *Builder* of August 13th, referring to the sanitary condition of many health resorts, seemed full of interest when lately read at one of our southern watering-places, and, illustrated as it was by present facts, its moral and warning were more full of importance than they otherwise might have been. No need for names when conditions are so similar. To interested parties the disparagement of one town is only a foil to exalt and show up the superexcellence of some equally unsanitary resort.

One would hardly feel disposed, during the few days or weeks of the annual holiday, to set himself the thankless task of instructing lodging-house keepers and local authorities in sanitary improvements, so that it seems probable that only by a slow and painful process will our older and smaller watering-places learn the necessity of setting their houses in order. Until then, the newer towns, where at least some regard has been had to hygiene, and those older towns that have boldly dealt with the question, will command increasing patronage and prosperity.

Three questions concern the health-seeking visitor:—First, the public sewerage and water-supply; secondly, the house system of drains and water and general construction; thirdly, the cleanliness and habits of the householders who "let lodgings." When the first and second are assured by competent local authority, the third will be pretty easily resolved by simple inspection. Until then the laborious and painstaking efforts of the most conscientiously clean "landlady" will be an unfair struggle against unknown evils.

As in surgical art, ready methods of treating cases are had recourse to when the elaborate appliances of an hospital are not at hand, so in sanitary matters much may be done at little cost to render a house fairly healthy. Ventilate the soil-pipe at its highest point; have an exit for foul air as high up as possible in every w.c., and so arranged that it cannot be shut; keep the door of the w.c. shut; let there be no direct connexion between the cistern or sink, and drain. Some of these may seem trifling, but, in reality, all are important.

Until there are many reforms inside and outside the houses where hang the cards bearing the tempting word "Apartments," sea-breezes and ozone, change of air and scene, will often be mysteriously negatived,—especially in the case of those most needing these advantages,—by the unwholesome lodging-houses where of necessity so many hours, even during the longest and brightest days of a summer's holiday, are spent.

ON THE PRESSURE OF WIND UPON A FIXED PLANE SURFACE.*

The recent failures of the Tay Bridge and other important structures during heavy gales of wind, have attracted much attention to the subject of this paper. The general solution of this problem may be thus briefly stated:—

Let v = the velocity of the current in feet per second.

h = the height through which a heavy body must fall to produce the velocity v.

w = the weight in pounds of a cubic foot of the impinging fluid [for atmospheric air averaging about 0·0765 lb.]

g = 32, the co-efficient of gravity.

Then $h = \frac{v^2}{2g}$; and since p the pressure of a fluid striking a plane perpendicularly and then escaping at right angles to its original path, is that due to twice the height h [Daubuisson's Hydraulics; Rouse's Experiments] we have simply

$$p = \frac{wv^2}{g}$$

$$= \text{(for atmospheric air)}\ \frac{0\cdot0765v^2}{32}$$

$$= \left(\frac{v}{20}\right)^2 \text{very nearly.}$$

From this easily-remembered formula the following Table of Pressure is constructed:—

Velocities in		Pressures in
Feet per second.	Miles per hour.	lb. per square foot.
10	6·8	0·25
20	13·6	1·00
30	20·4	2·25
40	27·2	4·00
50	34·0	6·25
60	40·8	9·00
70	47·6	12·25
80	54·4	16·00
90	61·2	20·25
100	68·0	25·00
110	74·8	30·25
120	81·6	36·00
130	88·4	42·25
140	95·2	49·00
150	102·0	56·25

In general, only these, the maximum pressures, are required; but sometimes, as in the case of the inclined sail of a windmill or ship, or the roof of a building, the diminished pressure upon the surface placed obliquely to the *effective* current is needed; we have then

$$p = \left(\frac{v \sin \theta}{20}\right)^2$$

in which v = the absolute velocity with which the air strikes the receding plane; and θ = the internal angle made by the obliquely-placed surface, and the direction of the impinging wind.

With regard to the phenomenon called "a gust of wind," nothing is known, either as to its cause, or as to its exceptional but almost momentary velocity, or as to the extent of the area over which it temporarily operates; but it is, notwithstanding, certain that a wind pressure of even 40 lb. on the square foot is unknown in these islands, because, as may be readily shown, this intensity of pressure would have sufficed to overthrow most of the long-existing factory chimneys, to overset post windmills, and to scatter the greater number of the slighter built domestic and other structures which have, nevertheless, "weathered many a storm," and still remain intact.

It remains to make a passing allusion to whirlwinds, tornados, and waterspouts, all the results of spiral motions apparently produced in some obscure manner by electrical action. These phenomena are very rarely observed to occur on an important scale in these kingdoms. The powerful forces concerned in or generated by these erratic movements have never been measured, and, consequently, cannot be formulated; but it may be observed that were they known they could not be introduced with propriety into calculations of the strength of structures intended to have a commercial value, because of the extreme improbability of any particular structure falling within the range of their destructive effects. They are, in fact, within the legal category of "Actus Dei."

The conclusion of the author of this paper, therefore, is that for structural calculations a maximum wind pressure of 40 lb. per square foot may be very safely adopted, notwithstanding some reported anemometrical observations to the contrary.

With regard to these observations the author remarks that the instruments in use are little better than philosophical toys, and that, in general, they afford no direct, comparable, or reliable indications of either velocities or pressures; and that they are often so injudiciously placed as in some instances to record the effects of combined, and, therefore, locally accelerated currents; whilst, in other instances, they record only the effects of obstructed, and, therefore, locally retarded currents.

As the acquisition of accurate data is of great and increasing importance, the author suggests that the British Association and other learned societies interested in physical investigations should unite in providing the necessary funds and observers for the purpose.

* Revised by the author, Mr. Thomas Hawksley, F.R.S. Read at York.

THE LIVERPOOL UNIVERSITY COLLEGE AND THE CORPORATION.

The Liverpool Corporation have just decided to obtain Parliamentary powers for purchasing lands and buildings in Brownlow Hill, adjoining the old lunatic asylum, which has been purchased by the Council of the new University College, and to reconstruct the buildings thus proposed to be purchased, for the purposes of the college (subject to the use of the portion not built upon as a recreation-ground), the amount to be expended being 30,000*l.* In moving that the Council apply for the necessary powers, the chairman of the finance and estate committee of the Council observed that the great necessity of the present day was to improve the higher education of the people, and that to give higher scientific education to the youth of the community would greatly benefit the city at large. It was not a question to be limited to "value received," for he believed the city would receive value a thousandfold from the college; and when they bore in mind that private citizens had contributed their thousands, he thought that the least the municipality could do was to contribute to the cost of the college. Some opposition having been made to the proposal, the mayor, in warmly supporting it, said that the great fault of the present day with regard to education was that a most magnificent education was provided for the children of the poor, while for the class which provided the greater part of the enterprise of the country in our manufactories, shipbuilding yards, mines, and the iron industries, absolutely nothing had been done. But the Liverpool College would not be entirely for the middle class; it would be open for those of the poorer class who showed intelligence, and they would receive grants from the Council of Education which would take them up to University College. The proposal was unanimously adopted.

The City of London College.—The present building in Leadenhall-street is too small for the work carried on, and it is proposed to erect a new building in White-street, Moorfields, at a cost of 15,000*l.*, towards which there is a sum of 5,000*l.* in hand. The council ask for assistance to carry this out, especially from the Corporation and large employers of labour in the City.

THE LIVERPOOL BUILDING AND SANITARY ACTS.

AMONGST the Private Bill applications to be made in the next session of Parliament is one by the Liverpool Corporation for powers to amend the local building and sanitary Acts, and it is intended to hold a conference with the Architectural Society on the several amendments which it is proposed to make in the existing Acts. Amongst others the contemplated amendments include powers to have cases of infectious disease compulsorily registered; also that powers shall be given to the Council to buy insanitary property by agreement, if they can, instead of compulsorily. They also propose to have control over the great network of telegraph wires over the town. During the discussion which took place when the proposed Bill was before the Council, Sir James A. Picton strongly supported its advisability, observing that its provisions were urgently needed in the interests of the city's welfare.

THE NEW EDDYSTONE LIGHTHOUSE.

THE lantern has been added to the new tower. The old lighthouse by its side looks singularly puny in contrast. All the exterior fittings are of gun-metal. The tower itself, as our readers are aware, is entirely of West country grey granite, save a few courses at the base, which are of Aberdeen. The lantern is the largest in the world. The fog-bells weigh each over two tons (4,486 lb. and 4,627 lb. respectively). They stand 4 ft. 6 in. high, and are 5 ft. 1¼ in. diameter at the mouth. They are fixed 130 ft. above high-water mark. Messrs. Chance, of Birmingham, have put up the lantern. The bell-shaped cap above is 150 ft. above high-water mark. Plymouth may now boast of by far the finest lighthouse tower in the world. A very excellent photograph of it was taken last week by Mr. George Long, photographer, Union-street, Plymouth. The work is expected to be complete by the time of the proposed visit of the Associated Chambers of Commerce, which is fixed for October 6th.

DEVELOPMENT OF WATER POWER IN THE UNITED STATES.

AT the thirteenth annual convention of the American Society of Civil Engineers, held at Montreal lately, Mr. James Bicheno Francis, president, delivered an address, in the course of which he said:—Water-power in many of the States is abundant, and contributes largely to their prosperity. Its proper development calls for the services of the civil engineer, and as it is the branch of the profession with which I am most familiar, I propose to offer a few remarks on the subject. The earliest applications were to grist and saw mills; carding and fulling mills soon followed; these were essential to the comfort of the early settlers, who relied on home industries for shelter, food, and clothing, but with the progress of the country came other requirements. The earliest application of water-power to general manufacturing purposes appears to have been at Paterson, New Jersey, where "The Society for Establishing Useful Manufactures" was formed in the year 1791. The Passaic River at this point furnishes, when at a minimum, about eleven hundred horse-power, continuously night and day.

The water-power at Lowell, Massachusetts, was begun to be improved for general manufacturing purposes in 1822. The Merrimack River at this point has a fall of 35 ft., and furnishes, at a minimum, about ten thousand horse-power during the usual working-hours.

At Cohoes, in the State of New York, the Mohawk River has a fall of about 105 ft., which was brought into use, systematically, very soon after that at Lowell, and could furnish about fourteen thousand horse-power during the usual working hours, but the works are so arranged that part of the power is not available at present.

At Manchester, New Hampshire, the present works were commenced in 1835. The Merrimack River at this point has a fall of about 52 ft., and furnishes, at a minimum, about ten thousand horse-power, during the usual working-hours.

At Lawrence, Massachusetts, the Essex Company built a dam across the Merrimack River, commencing in 1845, and making a fall of about 28 ft., and a minimum power, during the usual working-hours, of about ten thousand horse-power.

At Holyoke, Massachusetts, the Hadley Falls Company commenced their works about 1845, for developing the power of the Connecticut River at that point, where there is a fall of about 50 ft., and at a minimum, about seventeen thousand horse-power during the usual working hours.

At Lewiston, Maine, the fall in the Androscoggin River is about 50 ft.; its systematic development was commenced about 1845, and with the improvement of the large natural reservoirs at the head waters of the river, now in progress, it is expected that a minimum power, during the usual working-hours, of about eleven thousand horse-power will be obtained.

At Birmingham, Connecticut, the Ousatonic Water Company have developed the water-power of the Housatonic River by a dam giving 22 ft. fall, furnishing, at a minimum, about two thousand horse-power, during the usual working hours.

The Dundee Water and Land Company, about 1858, developed the power of the Passaic River, at Passaic, New Jersey, where there is a fall of about 22 ft., giving a minimum power, during the usual working-hours, of about nine hundred horse-power.

The Turner's Falls Company, in 1866, commenced the development of the power of the Connecticut River at Turner's Falls, Massachusetts, by building a dam on the Middle Fall, which is about 35 ft., and furnishes a minimum power, during the usual working-hours, of about ten thousand horse-power.

I have named the above water-powers as being developed in a systematic manner from their inception, and of which I have been able to obtain some data. In the usual process of developing a large water-power, a company is formed who acquire the title to the property, embracing the land necessary for the site of the town to accommodate the population which is sure to gather around an improved water-power. The dam and canals or races are constructed, and mill sites with accompanying rights to the use of the water are granted, usually by perpetual leases, subject to annual rents. This method of developing water-power is distinctly an American idea, and the only instance where it has been attempted abroad, that I know of, is at Bellegarde, in France, where there is a fall in the Rhone of about 33 ft. Within the last few years works have been constructed for its development, furnishing a large amount of power, but from the great outlay incurred in acquiring the titles to the property, and other difficulties, it has not been a financial success. The water-powers I have named are but a small fraction of the whole amount existing in the United States and the adjoining Dominion of Canada. There is Niagara, with its two or three millions of horse-power; the St. Lawrence, with its succession of falls from Lake Ontario to Montreal; the Falls of St. Anthony, at Minneapolis, and many other falls, with large volumes of water, on the upper Mississippi and its branches. It would be a long story to name even the large water-powers, and the smaller ones are almost innumerable. In the State of Maine a survey of the water-power has recently been made, the result, as stated in the official report, being "between one and two millions of horse-power," part of which will probably not be available. There is an elevated region in the northern part of the South Atlantic States exceeding in area one hundred thousand square miles, in which there is a vast amount of water-power, and being near the cotton fields, with a fine climate, free from malaria, its only needs are railways, capital, and population to become a great manufacturing section. The design and construction of the works for developing a large water-power, together with the necessary arrangements for utilising it, and providing for its subdivision among the parties entitled to it, according to their respective rights, affords an extensive field for civil engineers, and, in view of the vast amount of it yet undeveloped, but which with the increase of population and the constantly increasing demand for mechanical power, as a substitute for hand labour, must come into use, the field must continue to enlarge for a long time to come. There are many cases in which the power of a waterfall can be made available by means of compressed air, more conveniently than by the ordinary motors. The fall may be too small to be utilised by the ordinary motors; the site where the power is wanted may be too distant from the waterfall, or it may be desired to distribute the power in small amounts at distant points. A method o compressing air by means of a fall of water has been devised by Mr. Joseph P. Frizell, C.E., of St. Paul, Minnesota, which, from the extreme simplicity of the apparatus, promises to find useful applications.* The principle on which it operates is by carrying the air in small bubbles in a current of water down a vertical shaft to the depth giving the desired compression, then through a horizontal passage, in which the bubbles rise into a reservoir near the top of this passage, the water passing on and rising in another vertical or inclined passage at the top of which it is discharged, of course at a lower level than it entered the first shaft. The formation at waterfalls is usually rock, which would enable the passages and the reservoir for collecting the compressed air to be formed by simple excavations with no other apparatus than that required to charge the descending column of water with the bubbles of air, which can be done by throwing the water into violent commotion at its entrance, and a pipe and a valve for the delivery of the air from the reservoir. The transfer of power by electricity is one of the problems now engaging the attention of electricians, and it is now done in Europe in a small way. Sir William Thomson stated in evidence before an English Parliamentary committee, two years ago, that he looked "forward to the Falls of Niagara being extensively used for the production of light and mechanical power over a large area of North America," and that a copper wire half an inch in diameter would transmit twenty-one thousand horse-power from Niagara to Montreal, Boston, New York, or Philadelphia. His statements appear to have been based on theoretical considerations, but there is no longer any doubt as to the possibility of transferring power in this manner; its practicability for industrial purposes must be determined by trial. Dr. Paget Higgs, a distinguished English electrician, is now experimenting on it in the city of New York.

CONSTRUCTION OF PUBLIC LIBRARIES.

AT the final meeting of the Library Association, held last week in the Hall of Gray's Inn, Mr. William Archer, librarian of the National Library of Ireland, read a paper entitled "Suggestions as to Public Library Buildings: their Internal Plan and Construction, &c.," in view of the intended transference of the books constituting the National Library of Ireland to another building. Briefly, the requirements were stated as "compact stowage to save space, combined with short distances to save time." There should be a good-sized, lofty and commodious, well-heated, well-lighted, well-ventilated, comfortably-fitted, and tasteful reading-room for the general public, and side by side two or three minor rooms for more exclusive study, one of which should be devoted to lady readers. It was desirable also to have a small room for conversation. In these rooms no book should be kept except books of reference, which the public might take from the shelves. The books should be brought from the stores by attendants, and the rooms might be classified, being devoted to different classes of readers, such as the readers of light fiction and those reading more recondite subjects. The stores of books, or library proper, should be in the apartments adjoining, and, as much as possible, grouped around the reading-rooms. They should be approached without necessarily intruding upon or passing through the reading-room. The reader of the paper dwelt at length on the nature of the internal fittings of the store-rooms, and recommended that the reading-room should be on the first story of the building, so that the ground-floor and the second floor might be available for storage. Obviously a library building ought to be isolated, and it should, as far as possible, be fireproof. To aid in the latter purpose the bookcases and tables might be made of iron, covered with leather to obviate injury to the books. The structure of the building should be so planned as to admit of future extension of storage room. Such an arrangement as he had suggested would meet the requirements of a library for a much longer period than the methods now in vogue. What was wanted was despatch in bringing the books required from the shelves and placing them at once before the readers; and the advantages of this plan he thought would be obvious. Distance and effort

* Journal of the Franklin Institute for September, 1877.

would be reduced to a minimum, and time would be manifestly saved. The paper concluded by a reference to a plan for library buildings suggested by Mr. W. F. Poole, librarian of the City Public Library, Chicago, and some points of difference were noticed. Mr. Archer stated that the general ideas and leading principles of his plan, as submitted to the council of trustees of the National Library, had been approved, and he expressed a hope that they might be embodied in the plans which the architect might be called upon to make.

ELECTRICITY AS A MOTIVE POWER.

AT the Electrical Exhibition in Paris, various machines show the application of machinery as a motive power. For example, there is a circular saw driven by electricity. The diameter of the saw is 3 ft., and the planks upon which it works are 5 in. thick. M. Piat exhibits in the same part of the building a stone cutter and an electrical hammer, which does all the work usually assigned to a steam hammer. Close to these machines is another for pumping water, driven by a Gramme motor; the large volume of water which is thrown out conveys to the eye some idea of the great force which can be transmitted by electricity, although, in reality, this machine does not require nearly so much force as many other motors in the exhibition. In the same corner we find a number of machines for driving band-saws, and so forth, all driven by the convenient little motor of M. Deprez. Near to this spot there is also a rock-drilling machine. The drill rotates under the influence of a Gramme machine, and while a hole is being bored it advances under the influence of the water pressure obtainable in Paris, which is about three atmospheres.

RAILWAY COTTAGE BUILDING.

AT the recent half-yearly meeting of the North Eastern Railway Company, the chairman made some interesting observations in reference to the building of cottages for the servants in the company's employ, from which it appears that this particular class of dwellings have been erected on an extensive scale by the North Eastern directors. He said that at different times the company had taken power to build cottages for the accommodation of those in their employ; and they had now no fewer than 2,324 cottages, each of which had its own garden attached. The rent paid was a fair interest on the money laid out, and the cottages were built in places where the servants of the company could not otherwise obtain house accommodation. The company had in this way laid out nearly half a million. In addition to the cottages with gardens he had mentioned, there were 1,000 more cottages which had no garden attached to the house, but in the great majority of cases they had patches of land, sometimes on the side of the line, and sometimes at a little distance. The company had in this respect been making what he regarded as a very wise and judicious investment for themselves, besides adding materially to the comfort of their servants.

MACHINE-MADE LACE.

IN the first Cantor Lecture on the art of lace-making, now in course of publication, Mr. Alan S. Cole says:—Our English pillow-lace workers adopted some of the Brussels patterns and some of the Mechlin; but English taste was easily gratified by less skilfully arranged patterns, and found sufficient pleasure in the peasant laces of Buckinghamshire and Devonshire. It is these patterns that a good deal of the machine-made lace imitates, though within the last three or four years there has been a marked phase of other more ambitious imitation in the machine-lace trade. Something akin to the rich patterns of ancient hand-made lace is now made by the machine, and to the majority this substitution of machine-made for hand-made goods is satisfactory. As a rule, the difference between machine and hand made lace is not detected by the many. If there is a difference, to some it is that machine-made lace, from some points of view, is the more wonderful and more to be prized of the two sorts of work. Setting aside any prejudices one may have, and reviewing the variety of forms wrought years ago, we may consider some of the circumstances of the production of laces. Sometimes laces were made in dim and dark cellars, so that the soft fragile threads should retain their elasticity, and not become brittle. A ray of light alone was allowed to fall upon the workwoman's cushion. What an expense of eyesight and health must then have taken place! Compare truly costly works produced in such circumstances, with the low-priced repetitions done in taut wiry cotton threads which grow with precise monotony of pattern in the bustle and clatter of machinery, at the expense of iron and steam, and one is perhaps inclined to be glad at the release of human labour from penalties like those which formerly accompanied lace-making. I do not think any one can well say what may succeed to the mechanically devised and produced materials now called lace. They seem to satisfy present demand and to reflect the taste and ability of the age. Is it vain to hope for a revival of hand-made works? Is the time to arrive when machinery shall have exhausted itself in its endeavours to infuse into its productions the quality of handwork, or has a period commenced when people shall be contented with mechanical instead of manual art, and so from this, possibly, pass on to a condition of indifference to fine artistic works of handicraft, which not many years since were reported to have been pronounced by a philosopher and leader of opinion to be but the rubbish of human labour?

PATENT RECORD.*

ABRIDGMENTS OF SPECIFICATIONS

Published during the Week ending Sept. 3, 1881.

5,509. J. H. Corke, Southsea. Material for making chimneypieces, &c.

This is composed of 6 lb. of sulphate of iron, 4 lb. sulphate of aluminia, and 3½ lb. logwood, placed in 18 gallons of water, and boiled for two hours. The mixture is then strained and cooled. It is then run into moulds, and thoroughly dried by heat, when it is ready for use. Dec. 31, 1880. Price 2d.

247. F. Winterhoff and H. C. Webb, Worcester. Ornamental enamelling of iron, glass, &c.

The surface to be ornamented has a coating of enamel. The outline of the design is drawn on a stone, and an impression taken on transfer paper. The outline on paper is then transferred by pressure on the enamelled surface, and is burned into it. Colour is produced by printing on the paper in adhesive enamel colour, and transferring it to the surface. The pressure is effected by a pair of rollers, the lower one of wood, the upper of india-rubber. Jan. 21, 1881. Price 6d.

313. H. Skerrett, Sparkbrook. Apparatus for opening, closing, and fastening certain kinds of windows and skylights.

This is applicable to those windows, &c., that are hung or centered on pivots. A quadrant bar is fixed to the top of the window frame, and on the upper part of the sash is a plate, through which the quadrant bar passes. On the top of this plate is a cranked lever, the short arm of which takes into notches on the upper edge of the quadrant. A spring is fixed on the long arm to keep the short arm in these notches. A cord is fastened to the long arm to lift the short arm out of the notches, and to open the window. The other end of the cord passes over a pulley, and is fastened to the sash to close it again. Jan. 24, 1881. Price 8d.

351. R. Jackson, Leeds. Warming and heating buildings, tanks, vehicles, &c.

A lamp is enclosed in a pipe with a bell-shaped mouth, which pipe is continued in coils to heat the building, &c. (*Pro. Pro.*) Jan. 26, 1881. Price 2d.

387. J. Britton, Stamford. Firegrates or containers.

The object of this is to obtain "slow combustion" in common grates and stoves. A form is made of fireclay to fit the grate with bottom, back, and two sides. This is placed in the grate. Jan. 28, 1881. Price 6d.

392. T. J. Sloan, St. Maude, France. Apparatus for thawing ice in water supply-pipes, &c.

A portable boiler is used, the steam in which forces the hot water up in a flexible tube, which is inserted in the pipe to be thawed and forced into the same by springs. (*Pro. Pro.*) Jan. 28, 1881. Price 2d.

403. T. Bate, Kilburn. Ventilating pots or cowls for soil-pipes.

The cowl is the ordinary cone chimney-cowl, but at the top of the cone is an outlet, from which rises a cylinder of wire gauze, above which is a cap. The wire gauze prevents any down-draught. Jan. 29, 1881. Price 4d.

406. J. Hopkinson, Manchester. Apparatus to prevent the formation of ice in water supply-pipes.

A copper ball or chamber is connected with the main supply pipe, as near its entrance into the building as possible. This is inclosed in a cover or hood of fireclay, with a hole in the top, which rests on a perforated plate. Through this passes the gas-burner, and when this is lighted the water in the ball is heated and rises in the supply-pipe. Jan. 29, 1881. Price 6d.

410. L. J. Newman, Inchbrook. Cistern valve.

A tubular valve is used, from the upper end of which passes a tube which reaches to the water level, and which therefore serves as an overflow pipe and as an air-pipe to the valve. (*Pro. Pro.*) Jan. 31, 1881. Price 2d.

Published during the Week ending Sept. 10, 1881.

380. W. Leggott, Bradford. Closing and fastening doors.

In the bottom of the hanging style of the door is the centre of a toothed pinion, which works into a rack placed in guides. At the end of the rack is a screwed spindle, round which is coiled a spring. When the door is opened the pinion actuates the rack and puts the spring in tension, which shuts the door again, when it is liberated. A bolt is arranged to lock the rack and fasten the door. Jan. 28, 1881. Price 6d.

439. E. J. Hill, Westminster. Means of hanging or supporting window-sashes and blinds, &c.

A rod is fixed vertically to the frame. A piece of metal, with a hole in one extremity to work over the rod, is placed loosely in a frame, which is fixed to the sash. This piece of metal works on a fixed fulcrum, and while the hole is in line with the rod, the sash will move freely, but when it is turned the eye grips the rod and prevents the sash moving. (*Pro. Pro.*) Feb. 2, 1881. Price 2d.

523. J. Westley, Birmingham. Fire-places.

The back is formed of fire-clay, &c., with a nearly horizontal projecting part above the fuel to radiate the heat into the room. (*Pro. Pro.*) Feb. 7, 1881. Price 2d.

536. R. H. Gudgeon, Winchester. Chimney-piece coverings or castings.

The jambs and friezes of the chimney-piece coverings are made in separate parts, and so fixed that they can slide one on the other as required. They can, therefore, easily be adapted to any different size or form of chimney-piece. Feb. 8, 1881. Price 6d.

* Compiled by Hart & Co., Patent Agents, 28, New Bridge-street, E.C.

CHURCH DECORATION.

New Mills (Derbyshire).—St. James's Church, erected a very few years since at the cost of Mr. and Mrs. John Mackie, of New Mills and Wakefield, as a memorial to the lady's parents, has been re-opened for service after receiving interior art decoration. This is subordinated to the architectural features of the building, which it emphasises. The more novel detail is the introduction within four pointed arch wall-recesses in the nave of as many groups of spirit-fresco painted figures, embracing the subjects of Christ blessing Little Children, the Sermon on the Mount, Feeding the Five Thousand, and the Final Commission to the Apostles, with suitable text legends beneath. These groups compose pyramidally, and are in dark outline, relieved by a dull Indian red background, with here and there a little gold. In the ornamented bases are emblems of the four Evangelists. The artists of the frescoes and decorations are Messrs. Powell, Brothers, of Leeds,—Mr. W. Swinden Barber, of Halifax, being the supervising architect.

LONDON FRONT GARDENS.

PASSING through the familiar districts of South Kensington and Earls Court the other day, among many large and many well-built houses, one general drawback was very evident. It was the want of front gardens, which, in a neighbourhood comparatively suburban, is a great fault. We are perfectly aware that the high value of land around London makes it difficult to devote even a small portion as a garden to each house, but in many cases it is quite practicable to do so; that is, just sufficient to operate as a screen and as a pleasant and refreshing relief to the buildings.

In going up one road and down another, among tall houses without any vegetation visible, it is wearisome to the eye to see nothing but bricks, mortar, and dust,—dust, mortar, and bricks, whichever way we turn. It reminds us of the agreeable nickname of "The Catacombs," bestowed by Thackeray on the Harley-street region. There is now, of course, no remedy for streets which are already built over, but in future we wish to invite the attention of owners, architects, and builders to the vast improvement which is given to the appearance of a street by having a limited patch of green before each house. Much ground could not be afforded, and again, ladies, as a rule, do not like long front gardens in which during rain a bonnet may be spoiled while passing from the carriage or cab to the door. But a slip, even two or three yards wide, irrespective of the area, would hold some evergreens or a small tree, and give the agreeable relief which we advocate. As an instance in question, we may point out the district of Campden-hill, where the houses are set back a total distance, including areas, of from 10 ft. to 15 ft., the front space planted with evergreens; this is a pleasant and successful part, including Phillimore-gardens, Essex and Durham villas, Stafford-terrace, &c. Leinster-gardens,

Bayswater, is another instance. Parts of Cromwell-road, Queen's-gate, Harrington-gardens, and other streets farther out, are examples, on the contrary, of the dry and unrelieved style.

H. & R. POWELL.

LINCOLN'S INN CHAPEL.

THE Chapel of Lincoln's Inn is a work by Inigo Jones,—a dated work, too, for it was consecrated on Ascension Day, 1623,—and is an example of the latest phase of Gothic architecture. Without asserting that the old is in no case to give place to the new, we may surely, in this case, seriously ask under whose advice, and for what justifying purpose, have parts of this interesting building been demolished, and whether or not more is to follow? The well-known groined staircase has been knocked down, and the "pieces" are deposited in the groined open way beneath the chapel, where lawyers were wont to walk "and confer their learnings." One of the masons engaged in the work was somewhat indignant when we termed this "destruction," and asserted that all the pieces were numbered, and that he intended to make a drawing so that the staircase might be put back again twenty years hence if desired! We endeavoured to learn who was the architect who took the responsibility of this regrettable act, but failed,—none of the workmen about knew anything of him. It is sincerely to be hoped, this matter having already been publicly commented on, that proper pressure has been brought to bear on the Benchers.

VERGERS AND CATHEDRALS.

SIR,—I have the pleasure to inform "C. T. H." that at the meeting of the British Association the members were saved the infliction of the verger. Those who visited the Minster did so under the guidance of the Dean or one of the Canons. I was one of a large party conducted by the Dean. He was instructive and cheerful, without being vulgar, and he did not offer to lay a wager with any of us upon the extent of our ignorance.

The suggestions contained in the last paragraph of the letter of "C. T. H." are admirable, and will, I hope, be carried out.

The remarks of Mr. Smirke do not touch the point at issue at all. He could not have gone over the cathedral with the mob at 6d. a head, or he would not have been allowed to spend an hour in the crypt making notes for his pattern-book. He must have had a special privilege granted to him, which, doubtless, entailed "a complex and delicate" tip to "the model of politeness and intelligence." Grammatical exactitude and propriety of expression are, perhaps, not necessary for intelligence; or there may be a superior verger kept for architects and private visitors. Should this not be the case, and Mr. Smirke intends publishing his notes of the information acquired from the verger, I hope he will submit them beforehand to some friend familiar with the acquirements of grammatical propriety, so that the solecisms may be corrected. Being allowed to see the cathedral under exceptional circumstances, how can he venture to give an opinion of what is said to "the large number of persons of different capacities" by the verger whose vulgar nonsense I quoted?

Mr. Smirke, excusing the vergers of England by what is done at St. Denis, convinces me that he must have been at the same school with that eccentric logician who made so strange a reply when he was told how dirty his hands were.

F. S. A.

SIR,—There is, at least, one cathedral in England where one may revel amidst glorious chapels, and amongst wondrously beautiful detail, without having a verger at one's coat-tails, and that is at Exeter. The duly appointed officials are always in attendance, but the merest hint that one prefers to stroll quietly about by one's self is at once sufficient for Messrs. Parsons and Thomas, the vergers in question, who are always perfectly content to leave the visitor to follow his own courses until the next service hour. The only restriction put upon the public, and that a most vexatious one, is that no permission can be given to sketch without going through a formula which might possibly take several days to comply with. What with getting the Dean's permission, to allow the Canon in residence, to instruct the Cathedral surveyor, to direct the clerk of works, to give the vergers orders, to permit you to draw and the running about from pillar to post that all this involves, the short hours during which the sacred fane is available to the public so soon slip away that, as a rule, people find the procuring of the necessary permit very much more bother than it is worth.

Yet, be it remembered, Exeter Cathedral boasts of two of the finest Norman towers in England (built 1107—1206). The most perfect and beautiful Early English oak carvings in this country are Bishop Bruere's (1224–44) half-hundred choir-seats; and certainly the loveliest wood-carvings belonging to the Decorated period are to be found upon Bishop Stapeldon's exquisite throne, which is itself by far the largest and most magnificent bishop's throne in the entire world. Again, the sedilia, made in the same bishop's time, and wrought entirely of stone from the neighbouring quarry of Beer, is probably one of the lightest and most delicately-exquisite specimens of Decorated masonry in existence. Further, the most imposing and majestic feature in the whole building is the unbroken run of Exeter Cathedral's roof groining. It is nearly 400 ft. long, and gives a continuous succession of gracefully-vaulted lines, which are not exceeded in beauty by any roof I ever saw in my life,—"There is a skeleton in every house," the old saw says; and the one that exists at Exeter is the unnecessary difficulties placed in the way of drawing. Between service hours every visitor should have a perfect right to make such notes and sketches as suggest themselves. Englishmen are apt to kick against asking the permission of that old fogey and of this, to do that which the natural instinct of every properly-reasoning man tells him he has an absolute right to do.

HARRY HEMS.

SIR,—On more carefully reading the letters on the above, I find I was mistaken as to the character of the complaints from "F.S.A." and others. I thought myself justified in making the remarks I did, as, after a long absence, I have spent much time in visiting our cathedrals. Of course, I quite agree with your correspondents that vergers are "bores," and that their company is unfairly forced upon visitors. They should, in fact, only act as policemen and custodians of the noble buildings to which they are attached. If, by your powerful influence, you can bring about such a happy state of things, and make a visit to our sacred buildings less like "doing" the State Apartments at Windsor or the Tower of London, you will, I am sure, earn the lasting thankfulness of all.

SYDNEY SMIRKE.

THE CHURCHES AND TOWNS OF BUCKINGHAMSHIRE.

SIR,—Permit me to correct an error under which, as I think, the writer of the article on "Maids Morton Church," in your last issue, evidently labours. He says:—

"Buckinghamshire is by no means a rich county for the ecclesiologist, and it is somewhat singular that in such a purely agricultural district the towns should be so remarkably uninteresting, and the churches should have fared so badly. Yet, somehow or other, the important towns in Buckinghamshire seem to have been deprived of their ancient churches about a century or so back, and for what reason it is impossible to say."

And not content with running down our churches, he proceeds to speak very disparagingly of our towns. Now, in both these respects he is wrong. Does he know Newport Pagnell? Here is a town, although with a population some hundreds less than 4,000, yet with a church which, for size, beauty (both of external situation and internal arrangements), and attendance is not to be surpassed in this or any other county; and a town which, for its High-street, and the shops in it, excels many in other counties with double and treble its population. And the same might be said of many other towns and churches in Buckinghamshire.

I trust to your sense of justice to insert these few lines with a view of counteracting an erroneous impression which may have been produced respecting our county by the article in your last issue already referred to.

JOSEPH SIMPSON.

P.S.—Newport Pagnell Church (both external and internal) and the High-street, would make excellent illustrations for the pages of the *Builder*.

Glass-covered Iron-ware.—Is this manufacture still carried on? More than one correspondent asks us the question.

FIRE AND WATER.

SIR,—I, like many others, seek your aid when in distress, and will thank you to insert my remarks in your next issue on the subject to which they apply, namely, that of the defective provision for extinguishing fires in the metropolis. This subject you have handled over and over again, and I fear I cannot use terms sufficiently strong to induce you to place them before the public. Let the subject speak for itself, and direct your decision, viz., the security of lives and property, and the reduction of destruction thereof; and wherein myself and many readers of your journal see no difficulty. I remember some few years ago reading a proposition made by a gentleman of some standing in the metropolis, and evidently with some knowledge of the subject, being before the Common Council or the Metropolitan Board, a scheme for providing elevated reservoirs in certain parts of the City, whereby mains, and thus hydrants, would be constantly supplied or charged; so that at the outbreak of a fire a policeman on that beat could connect hose, which would be enclosed in the nearest recess available, same as now done in the Pavilion at Brighton, and elsewhere, and be able to connect to the nearest hydrant and turn on without waiting for fire-engine or any other aid. That proposal was not accepted, and thus the heart of London is left unprotected. I, as a practical man, consider that was a scheme, if I may use the term, which would, had it been carried out, have saved many lives and much property. The late fire in the City exemplifies the necessity of some such ready application, and until such provision be made lives and property will be at stake.

It is a disgrace to the metropolis, or to the managers or mismanagers, that London should be last in the race of water supply for the inhabitants and provision for extinguishing fires. The talent that can be brought to bear on this important question is within call. Many engineers, and thoroughly practical, would soon devise the machinery and arrangements, and give a guarantee for its efficiency to accomplish this end. The pecuniary matter should be a secondary consideration. Taking all in all, and our noble Prince lending his presence and assistance to attain the desired end, I do consider it reflects strongly on those in office and power, when all interested can look around in the provinces and see the wise provision made for the security and prosperity of its inhabitants.

Pray, Mr. Editor, do all you can to bring this important subject forward. Urge on, as you have already done, the necessity, and show forth the grave and responsible position of those who are in power, and neglect to bring about the remedy so easily attainable.

T. S.

OWNERSHIP OF BILLS OF QUANTITIES

SIR,—Will one of your numerous readers, who is an architect or quantity surveyor, kindly inform me (in the following case) as to the ownership of a priced and moneyed-out set of lithographed bills of quantities upon which a builder had *successfully* tendered? Do they belong to the builder or the architect, who had taken off his own quantities? The builder, although successful, had to submit to a revised estimate being prepared by the architect, the whole of the works coming to too much money, and these quantities were borrowed to form the basis of the valuation of the revised estimate. I was then called upon to represent the builder, and the revised estimate not being to my satisfaction, I withdrew the builder's original tender. The architect then claimed and refused to give up the lithographed priced and moneyed-out bills of quantities, upon the ground that they had not been paid for, and, consequently, were his property. Certainly the charges for lithography had not been paid, neither had the charges for taking off the quantities; nevertheless, under these circumstances, did these bills of quantities belong to the architect or the contractor?

WILLIAM H. PIPE.

SCHOOL-BOARD SCHOOLS.

Peckham.—The new Board-school in Wood's-road, Peckham, has been opened by the School Board for London. The school, which is the 239th new building opened by the Board, and the 60th in the Lambeth division, is built to accommodate 1,400 children. The cost of the building has been 8*l.* 16*s.* 6*d.* per child, and the cost of the site has been somewhat under 6*l.* per child. The school has been erected from the designs of Mr. E. R. Robson, the architect to the Board.

Salford.—On the 17th inst., Mr. Joseph Rice, the vice-chairman of the Salford School Board, laid the memorial stone of the Trafford-road Board-school, now being erected in the Ordsal ward to provide accommodation for 600 children. The school is situate at the corner of West Worsley-street and Robert Hall-street. The main building in Robert Hall-street is two stories high. On the ground-floor is to be the girls' department, which will have a schoolroom 50 ft. by 32 ft., and two class-rooms, 17 ft. by 16 ft. The entrance will be in London-street, and adjoining the entrance a cloak-room will be provided. The boys' department, on the upper floor, will have similar accommodation to the girls', and be entered from West Worsley-street by a well-lighted staircase. The infants' department is to be at the rear of the main building, and only one story high; it will include a main schoolroom and a large class-room for the junior infants. Large playgrounds are to be provided, of which a considerable portion will be covered. The buildings will be in the Gothic style. The fronts are being faced with selected brick. The string-courses and other dressings are generally in red terra-cotta. The contract for the whole of the work, amounting to 4,750*l.*, is being carried out by Mr. J. L.

Ward, builder, Manchester, from the designs and under the superintendence of Mr. Henry Lord, architect, Manchester.

Miscellanea.

Middle-Class Education.—A new middle-class school for 200 girls was opened last week in Chenies-street, Tottenham-court-road, the whole cost of which, amounting to several thousands of pounds, has been defrayed by a lady of the Goldsmid family. The school site happens to be on the edge of the Bedford Estate, adjoining the land which, centuries ago, was bequeathed for educational purposes by John Carpenter to the City of London, and which gave rise to the present City of London School. The new school and its playground occupy a corner site, about 70 ft. square, of which about one-half is built upon, the remainder being an open playground. The building is, inclusive of the basement, five stories high. The teaching department is entirely on the ground and first floors, and consists of five class-rooms, each holding forty children. As it is occasionally desirable to have a room or hall large enough to accommodate all the pupils, for lectures, examinations, prize distributions, or similar occasions, and the site is insufficient for the construction of a separate room for such purposes, three adjoining class-rooms on the first-floor have been so constructed with movable partitions that they can be thrown together, thus forming a single compartment, about 66 ft. by 22 ft. By these shifting partitions the entire clear length and width of the three class-rooms are obtained for the formation of the hall, without the obstruction usually caused by movable partitions. Each separating partition consists of three widths, the two side-widths being large doors, folding back against the walls, the central width being a thick sound-proof revolving wood shutter, sliding up and down in grooves on the edges of the closed doors. On the first-floor there are three sound-proof music practising-rooms, with double doors; and on the basement, level with the playground, are luncheon-rooms for pupils and teachers, cloak-room, lavatories, &c., and kitchen and living-rooms for the caretaker. The second floor is devoted to the head-mistress; and the third floor, in the roof, forms a large winter or wet-day playground, which will be fitted with suitable gymnastic apparatus. The exterior of the building, which is faced with red bricks and red Mansfield stone dressings, is an adaptation of the Early French Renaissance style, the high-pitched slated roof containing the second and third floor stories. The architects are Messrs. Davis & Emanuel.

Scroll Ornamentation.—At a recent meeting of the Royal Historical and Archæological Institute of Ireland, Mr. Marcus Ward exhibited a rubbing and coloured tracing of Hiberno-Romanesque scroll ornamentation from the old church of Maghera, county Londonderry, and contrasted therewith the engraving of the same scroll work given by Lord Dunraven in his work on "Irish Ecclesiastical Remains," showing the inaccuracy of the latter. He drew the attention of the meeting to the wealth of artistic design which the work displayed, exemplifying the varied fancy of the early artists of Ireland. Mr. Wakeman objected to the idea that the famous Opus Hibernacum, for which Ireland was celebrated during the Middle Ages, was derived from foreign sources, and he pointed out that on the oldest megalithic monuments of Ireland, the elements of all classes of ornamentation, such as are found in the earliest manuscripts of the country, and even upon churches of a comparatively late period, can be traced.

The Fish Market Accommodation in London.—This subject is now, as readers of the daily papers know, occupying the attention of the Special Committee of the Corporation of the City of London, and instructions have been given that any suggestion as to a site for such market forwarded to the City Architect, Guildhall, on or before the 28th instant, will be considered.

An Exhibition of Domestic and Sanitary Appliances was opened at Wolverhampton on Monday last. Gas and other stoves are largely represented, Messrs. Barnard, Bishop, & Barnard, and other well-known firms, being exhibitors.

The Brighton Exhibition.—The eighth annual exhibition of modern pictures in the Pavilion at Brighton is now open. The private view took place on Wednesday, the 21st.

"Not an Arch; Something in Architecture."—Mr. F. T. Dollman, in his recent work on the Church of St. Mary Overie, Southwark (now commonly known as St. Saviour's), refers, if we mistake not, to the unseemly contests that have occurred from time to time in connexion with the election of "Chaplain," as the holder of the living is officially styled. The election is by vote of the inhabitant ratepayers, and the polling has been carried on amidst scenes of turbulence only capable of being summed up in the one word, "rowdyism." Even as Mr. Dollman's work was passing from the press, the parish witnessed another such contest, the proceedings connected with which led to an offer being made by the bishop of the diocese (Rochester) to raise or provide funds for the endowment of the chaplaincy and the maintenance of the fabric, on condition that the presentation to the living should vest in the diocesan. A meeting of the parishioners to consider the offer was held on the 12th inst., Mr. Thomas F. Rider, "Warden of the Great Account," in the chair. A minority of those present at the meeting, for reasons known to themselves, opposed the motion which was made for referring the Bishop's offer to a representative committee, which was, however, ultimately carried. In the course of the discussion, which must have edified the chairman (well known as a builder, and late President of the Builders' Benevolent Institution), the following dialogue took place, according to the report of the *South London Press*:—

> Mr. Lawson: What was it which kept up a church? (A voice, "An arch.") No, not an arch. Something in architecture. (Laughter.)
>
> Mr. Stafford: You mean the foundation-stone. (Loud laughter.)
>
> Mr. Lawson: No, not the foundation-stone. (Laughter.) Let me see,—the keystone. That's it. (Laughter.) Don't let us take away the keystone.

New Reredos, Cockington.—A new reredos in the parish church of Cockington, near Torquay, was unveiled on the 28th of August. The church, dedicated to SS. George and Mary, is an ancient Gothic building, pleasantly situated in the grounds of Cockington Court. The new reredos, which is a special gift, has been designed by Mr. James Hine, architect, Plymouth, and is in the Late Decorated style. It is made of English oak; the lower parts are enriched by linen panels, surmounted by a carved cornice. Above the altar-table the entire length of the reredos proper is formed, in the main, of seven continuous and connecting canopies. These, in each instance, spring from sculptured angels bearing shields, upon which are emblazoned the various emblems of the Passion. The recessed panel is of chestnut wood, and upon it is painted a representation of the Last Supper. This painting is by Mr. J. T. Fouracre, of Stonehouse, Plymouth. The new reredos has been made and carved by Mr. Harry Hems.

Building Societies.—A return has been issued of an abstract of the accounts furnished by building societies incorporated to the 31st of December, 1880, under the Building Societies Acts. The total number of societies reported upon, of which twenty-three are dissolved and twenty-one are in default, is 1,267. Only 1,015 of them report their membership, which amounts in the aggregate to 372,035. In 1,115 instances the total amount of receipts is returned at 18,694,555*l.*, and in 1,111 cases the liabilities are set down,—to the holders of shares, 21,813,095*l.*; to depositors and other creditors, 14,079,762*l.* In 903 societies the balance of unapportioned profit is returned at 1,104,735*l.*, and in 167 societies there is a balance deficit of 47,209*l.* The aggregate assets of the whole of the societies are returned as,—balance due on mortgage securities (not including prospective interest), 34,847,320*l.*; amount invested in securities and cash, 2,103,060*l.*

The Japanese Theatre.—Mr. Robert Irwin, in his capacity of Hawaian Consul, has just presented a very beautiful drop curtain on behalf of H. M. King Kalakaua to Mr. Morita, lessee of the Shintomiza Theatre. According to the *Japan Weekly Mail*, the curtain is of crimson Japanese velvet. The Hawaian royal coat of arms is embroidered in gold in the centre, and distributed on each side of this in white silk embroidery is the inscription,—"Presented to the Shintomiza Theatre by Kalakaua the First, King of Hawaii, in the second month of the year 2541 (Japanese era)." The curtain was manufactured by Nishimaru & Co. of Kiyoto, and is, we understand, the handsomest thing of the kind that has ever been used in a Japanese theatre.

Old Shrewsbury.—As some workmen were engaged last week in renovating the upper front portion of premises in Wyle Cop, Shrewsbury, occupied by Mr. Taylor, fishmonger, which for the duration of two leases of ninety-nine years were in the occupation of a county family named Lloyd, they knocked off some old thick plaster, and with it the rose of an ancient piece of carving. This led to a careful search being made, resulting in the discovery of a Perpendicular window of the time of Henry VII. in a wonderful state of preservation. The window has three lights with quatrefoils above. Above the window is a curved projection supporting the upper chamber, which has ribs of timber, each of which spring from a corbel. The cornice above the curve is a fine embattled one, and it is thought that above it is a concealed window similar to the one which has just been brought to light. It may be stated that the window discovered is of oak, but exactly similar in design to one in the Abbey Church in Shrewsbury, which is distinctly Perpendicular, and, therefore, there can be no doubt as to the date of that in question. Archæologists are decidedly of opinion that the room in which the window is placed was occupied by Henry VII. on the night before the battle of Bosworth, which decided the fate of Richard III.

Marble Work.—The largest work in decorative marbles yet done in the West of England is making rapid progress at Messrs. J. & E. Goad's Phœnix Marble Works, Stonehouse. The contract which Messrs. Goad are executing is the marble work for the church of the Brompton Oratory, South Kensington, now in progress. The arcading of the whole building will be supported by columns of Devonshire marble, and massive shafts with pilasters of similar stone will uphold the central dome and flank the entrance of each chapel. All the plinths throughout will be of Devonshire black, from the Billacombe and Pomphlete quarries. The dado-work will be of dark mottled, also from Pomphlete. The moulded base of each pilaster is a picked specimen of green marble, which also comes from quarries in Devonshire. The shaft of each pilaster will be of red Devonshire marble, cut in the quarries at Radford. The plinths of the columns, like those of the pilasters, will be of Devon black, the moulded bases of a sienna-tinted variety from Radford, and the columns themselves of a mottled stone from Pomphlete.

The Church Congress of 1881.—The arrangements for the Church Congress at Newcastle-on-Tyne are approaching completion. The Congress opens in the Town Hall on Tuesday, October 4th, and will be in session for four days. The Congress will discuss a variety of subjects of general interest at the present time, amongst them the modes by which religious life may be influenced by art, and the relation of the Church to the social movements of the day, with special reference to trade unions and co-operation. It is understood that Sir T. Brassey, M.P., will treat of the relation of the Church to the social movements of the age, with special reference to trade unions and co-operation. Mr. Beresford-Hope, M.P., is one among the speakers on the subject of the modes in which religious life and thought may be influenced by art.

Memorials of the Dead.—We understand that a National Society for Preserving the Memorials of the Dead in the Country Parish Churchyards of England and Wales is in course of formation, and among those who have joined the society are the Earl Beauchamp, the Earl of Carnarvon, the Earl of Glasgow, the Earl of Northesk, the Lord Talbot de Malahide, the Bishop of Ely, the Bishop of Argyll and the Isles, the Right Hon. A. J. B. Beresford-Hope, M.P., Mr. Stanley Leighton, M.P., &c. It is proposed shortly to hold inaugural meetings in London. Any persons desirous of joining are requested to send their names to Mr. Wm. Vincent, Belle Vue Rise, Lower Hellesden-road, Norwich, from whom all information, with copy of suggested rules can be had.

Sluicing the Pluckington Bank, Liverpool.—Sluicing operations for the removal of this obstructive bank in the Mersey were commenced on Saturday afternoon, at low tide, from three of the new pipes which have lately been constructed at the back of the George's Stage. The sluicing was continued on Monday; and on Tuesday, seven of the pipes were in operation during low water, and the effect on the bank is reported to have been everything that was expected.

The Sanitary Condition of Oxford.—A special meeting of the Oxford Local Board was held on Monday last to consider a letter received from the delegates of the university lodging-houses, with reference to the sanitary condition of their houses. A warm discussion ensued, many of the board considering that their authority had been usurped by the action of the university in calling in Mr. Griffith before they had been consulted; and it was held that many of the alterations suggested by that gentleman were not necessary. Mr. Laker moved that no further work be carried out, as ordered by Mr. Griffith, until his plans had been submitted to and approved by the Local Board; but he afterwards withdrew his proposition and seconded that of Alderman Galpin, "That a committee be formed to confer with the delegates of the lodging-houses with regard to the plans submitted to the Board by Mr. Griffith," which was carried unanimously. Alderman Hughes, the chairman of the Board, expressed his surprise at what had appeared in some of the London papers respecting the sanitary condition of Oxford, for he maintained that the city had been for years past in a very healthy condition, as evidenced by the Registrar-General's returns.

Irish Marbles.—Mr. George Aitchison, A.R.A., in a letter to the *Times* *apropos* of Irish industries, says that now marble is being largely used for interior decoration, it would be advantageous to have some place in London where all the Irish marbles might be seen. Irish red, Irish green, and Irish black marbles are well known and largely used, but the green Irish porphyry is scarcely known, and there may be many other Irish marbles which would be used if they were known. Although the ordinary Irish green marble, with its streaks of green, grey, and brimstone colour, is not a very effective marble, small portions of it are of the most lovely colour and quality imaginable, looking like dark green seaweed beneath the clear sea. What is wanted is a depôt with a showroom attached, containing large polished specimens of every sort, with the prices per foot marked on; the depôt to contain a good stock, so that the slabs or blocks might be chosen on the spot. It is very disappointing to have to wait until the marble can be sent from Ireland, and then to find that it is totally unlike the specimen chosen. He had a string executed that was to have been green, but it turned out to be grey with hardly a green spot.

Threatened Eclipse of Mr. Spurgeon's Tabernacle.—"General" Booth, speaking in Exeter Hall, at a "Council of War" of the body known as the "Salvation Army," on Monday last, is reported by a daily paper to have aroused much enthusiasm by declaring that the "army" must have built in London "a Salvation Temple, which should be an anti-type of the Temple of Solomon, at a cost of 100,000*l*, which should be open day and night for pilgrims from all parts of the earth." Here is a chance for those who go in for "big things" in the way of competitions; for, of course, for a building of this size (we are told it is to hold 10,000 people), if it ever comes to be erected, there will be a competition?

St. Giles's, Edinburgh.—In the course of the restoration of St. Giles's, Edinburgh, an arched recess has been discovered in the north wall of the Albany aisle, which was built by the Duke of Albany and the fourth Earl of Douglas as an expiation for the death of the Duke of Rothesay. The *Athenæum* says,—"This arched recess is 8 ft. high and 7 ft. wide, with a depth of 2 ft. or 3 ft. On the front of the arch is an exceedingly fine moulding of the thirteenth century, but it is more than half destroyed. Dr. Chambers has ordered the restoration of the moulding, and intends to place a recumbent figure in white marble of the Duke of Rothesay in the recess."

The Iron and Steel Institute will this year hold its autumn meeting in London, and the dates fixed are the 11th, 12th, 13th, and 14th prox. The meetings for the readings of papers on the three first days will be held at the Institution of Civil Engineers, and on the first day the Institute will be received by Sir Henry Bessemer, F.R.S., the president of the Local Reception Committee, and by the vice-president, Dr. Siemens, F.R.S.

Regent-street.—The owner of the new Panton-street Theatre has purchased some large premises in Regent-street, which he intends forthwith to convert into a Jews' synagogue. Mr. Thos. Verity is to be the architect.

The Luminous Paint.—Something seems needed to increase the usefulness of this material, and to give it a wider application. A correspondent writes,—"I brought a bottle of the luminous paint from York, a bottle about 4 in. high and 2 in. in diameter, and nearly emptied it in painting a card-board about 1 ft. long by 8 in. broad; so at present it is an expensive amusement. But the worst part is the nauseous odour! It is most horrible! For indoor work some change must be made, or the paint will be utterly unusable. Moreover, as the luminosity must be frequently refreshed by exposure to strong light, I do not see how it can be made available for dark passages, cellars, and such like." We see it stated in Eastern Counties newspapers that this paint is being used by the Post Office authorities for surrounding the apertures of wall and pillar boxes, and with much advantage in rural districts unprovided with gas.

Topsham Church.—The ceremony of restoring the flags of the Devon and Cornwall Fencibles to the Parish Church of Topsham, where they hung for a period of seventy-two years, was performed on Tuesday last by Mr. S. C. Hall, F.S.A., the well-known author, and only surviving son of Colonel Robert Hall, the commander of the Devon and Cornwall Fencibles, by whom the colours were presented to the church in 1802, when the corps was disbanded. They were removed from the church a few years ago during the rebuilding of the structure, and came into the possession of Major Keating, by whom they were lately presented to Mr. Hall, who has now restored them to the church. We are glad to hear that Mr. Hall, who is now nearly eighty-two years of age, has greatly improved in health during his recent sojourn in Devonshire.

Wistanstow, Salop.—A stained window has just been placed in the north transept of the parish church, in memory of the late Mr. John Hoggins and his wife, and other members of the family. The subject chosen is "The Ascension." The stonework of the window is of the Early Decorated style, with three lights. In the centre light the figure of Our Lord appears ascending, surrounded by a halo of light, while two disciples kneel on the ground beneath. In the two side lights other disciples are seen in different postures of adoration. It has been executed by Mr. John Davies, of the Wyle-cop, Shrewsbury.

TENDERS

For pulling down Cook's Almshouses, Mile-end-road, and rebuilding six houses and shops, for Mr. A. Barnett, Messrs. H. S. & C. A. Legg, architects:—

Longman	£5,190	0	0
Knight	4,090	0	0
Parrish	3,736	0	0
Caluan	3,709	0	0
Stephens	3,644	0	0
Williams	3,150	0	0
Gentry	3,090	0	0
Lusk	3,070	0	0
Button Bros.	3,000	0	0
England & Thompson	2,994	0	0
Judd	2,700	0	0
Chubb	2,112	0	0
Simpson	1,866	0	0

For the erection of two pairs of semi-detached houses, Champion Park, South Dulwich. Mr. A. Stanton Cook, architect:—

E. J. Godbold, Ilford (accepted).

For the erection of a stable and coachhouse at Pen Close, Uxbridge, for Mr. E. W. Woolls. Mr. Geo. Eves, architect:—

Hall (accepted) £25 10 0

For roadmaking, and sewering a new road, Southend-on-Sea, for Mr. D. R. Scratton:—

Wilkes & Co., London (accepted).

For alterations at the Hampton Court Palace, Hampton-street, Walworth, for Mr. W. Barnes:—

Cabinet and Fittings.

Turner & Price (accepted).

Pewtering.

Mathews (accepted).

For house, fence-walls, &c., in the Chape Park-road, St. Leonard's. Mr. A. Bradley Rooke, architect. Quantities by Mr. E. J. Paine:—

Womersley (too late)	£1,350	0	0
Cruttenden	1,348	0	0
Howell & Son	1,330	0	0
Vidler	1,290	0	0
Rodda	1,290	0	0
D. C. Jones & Co., Gloucester	1,273	0	0

For general repairs and renovation of Hughenden Manor, for the Executors of the late Right Hon. the Earl of Beaconsfield:—

Liley & Wood (accepted).

For drying warehouse to Messrs. Jenne & Co.'s (Limited) floor-cloth factory, Stratford-by-Bow. Mr. A. Bradley Rooke, architect. Quantities by Mr. E. J. Paine:—

Harper, Hackney	£2,573	0	0
H. G. Smith, Poplar	2,500	0	0
Salt, Bow	2,428	0	0
Mattock Bros., Holloway	2,379	0	0
Tongue, Plumstead	2,270	0	0
Jones & Co., Gloucester	2,187	0	0

For the erection of a private hotel in Arundel-street, Strand, for Mrs. Sobram. Mr. J. Dunn, architect. Quantities by Messrs. Nixon & Raven:—

Kirk & Randall	£9,555	0	0
Mowlem & Co.	9,300	0	0
Bywater	8,939	0	0
Morter	8,843	0	0
Patrick	8,475	0	0

For studio and chambers, Chalcot-gardens, England-lane, Hampstead, for Mr. Towneley Green. Messrs. Batterbury & Huxley, architects:—

Manley, Regent's Park (accepted).

For alterations and additions to "Drewstead," Woodfield-avenue, Streatham, for Mr. Alfred Ashton. Mr. Alfred Burr, architect:—

Philps & Bisiker	£1,070	0	0
Richardson Bros.,* London-wall	845	0	0

* Accepted.

For stables, coachhouse, &c., with living apartments over, Dulwich, for Mr. J. May. Mr. R. Peters, architect:—

Pierse & Banyard	£500	0	0
Watson & Dennett (accepted)	450	0	0

For proposed villa residence, Finchley, for Mr. W. T. Dippie. Mr. Richard Peters, architect. Quantities by the architect:—

Parrish	£1,198	0	0
Shepherd	1,163	0	0
Grover	1,162	0	0
Merritt & Ashby	1,133	0	0
B. Downs	1,060	0	0
T. Eanor Julian & Co. (accepted)	1,030	0	0

For new roads and sewers on the Hornsey-lane Estate, for Mr. Thomas Dence:—

Bloomfield, Tottenham	£1,440	0	0
Jenkins, Clapham	1,421	0	0
Keeble, Regent's Park	1,335	0	0
Pall & Sons, Bromley	1,299	0	0
Harris, Camberwell	1,250	0	0
Pizzey, Hornsey	1,227	10	0
Jackson, Leyton	1,200	0	0
McKenzie & Co., City	1,192	0	0
Dunmore, Hornsey (accepted)	1,145	0	0
Wilson, Walthamstow (too late)	1,095	0	0

For the erection of warehouses, No. 29, Farringdon-street, for Mr. R. J. Worley. Mr. R. J. Worley, architect. Quantities by Mr. Fife:—

Toms (accepted) £3,330 0 0

For erecting two shops and offices, Nos. 278 and 279, High Holborn, for Mr. R. J. Worley. Mr. R. J. Worley, architect. Quantities by Mr. Fife:—

Smith	£2,569	0	0
Lawrence	2,383	0	0
Toms (accepted)	2,239	0	0

For pulling down and rebuilding the Stationers' Arms public-house, High-street, Camden-town, for Mr. Charles Smith. Mr. William West, architect:—

F. & F. Wood	£4,675	0	0
Macey & Sons	4,238	0	0
Young, Cochrane, & Fraser	4,095	0	0
Turtle & Appleton	4,039	0	0
Patman & Fotheringham	3,960	0	0
Bowden	3,785	0	0
Williams & Sons	3,770	0	0
White	3,764	0	0
Toms (accepted)	3,643	0	0

For alterations, additions, repairs, &c., at the Mansfield Arms, Mansfield-place, Kentish-town, for Messrs. Meux & Co. Messrs. Gardener, Sons, & Theobald, architects. Quantities by Messrs. Selby & Rogers:—

Johnson	£1,450	0	0
Tetmas	1,340	0	0
Nightingale	1,197	0	0
Toms (accepted)	1,116	0	0

For erecting new dwelling-house in Pratt-street, Camden-town, for Mr. Blomfield. Mr. Henry Jacques architect:—

Toms (accepted) £435 0 0

For alterations and additions to stabling of the New Forest Hotel and Posting-house, Lyndhurst Railway Station, for Messrs. Hine Bros. Mr. W. H. Mitchell architect:—

C. R. White	£618	10	0
Thos. Carpenter	594	18	0
Chas. Pike	535	0	0
J. W. Rowland	449	0	0
J. Crook (accepted)	417	0	0

For alterations and additions to Nos. 1 and 2, The Fire Potters Bar, for Mr. G. Mills:—

Eldridge & Gee (accepted).

For a pair of semi-detached dwellings, without foundation work, for Mr. David Tildesley. Mr. Walter Graves, architect. Quantities by Mr. Walter Barnett:—

C. Kelland (accepted) £2,900 0 0

For the reconstruction of wine-vaults, Nottingham, exclusive of foundations, for Mr. H. G. Jalland. Messrs. S. Dutton Walker & Howitt, architects:—

Contract No. 6.

Vickers, Nottingham (accepted) ... £4,787 14 0

For rebuilding Bridge Wharf Brewery, Lewes, for Messrs. Harvey & Son. Mr. William Bradford, architect. Messrs. J. & A. E. Bull, surveyors:—

Patching & Son, Brighton	£4,388	0	0
Howard, Brighton	4,304	0	0
G. H. & A. Bywaters, London	4,059	0	0
Cheesman, Uckfield	3,990	0	0
J. T. Chappell, London	3,976	0	0
Peerless & Son, Eastbourne	3,910	0	0
Card & Son, Lewes (accepted)	3,808	0	0
Harman & Floyd, Lewes (irregular)	3,800	0	0
Knight, Lewes	3,643	11	5
Engineer and Millwright's Work.			
Shears & Sons	1,248	0	0
Worssam & Son	1,239	0	0
H. Pontifex & Sons	1,190	0	0
R. Ramsden & Son	1,159	0	0
J. J. Bennett & Son	1,120	0	0
Pontifex & Wood (accepted)	790	0	0
Coppersmith and Pipe Work.			
R. Ramsden & Son	1,178	0	0
Worssam & Son	1,124	0	0
J. J. Bennett & Son	980	0	0
Shears & Sons	944	0	0
H. Pontifex & Sons	900	0	0
Pontifex & Wood (accepted)	790	0	0
Backwork.			
Worssam & Son	327	0	0
J. J. Bennett & Son	285	0	0
R. Ramsden & Son	249	0	0
Orlev & Co. (accepted)	221	15	0
R. Whibley	206	10	0
H. Pontifex & Sons	200	0	0

For alterations and additions to the George IV. tavern, Vauxhall Bridge-road. Quantities by Mr. Edward Crutchloe:—

Boyce	£715	0	0
Foster	719	0	0
W. King & Sons (accepted)	698	0	0
Stiling	681	0	0
Badcock	604	0	0
Quinn	598	0	0

For alterations and additions to the Prince of Wales public-house, Merton-lane, Mitcham, for Messrs. J. Carter Wood, & Co., Westminster. Quantities by Mr. Edward Crutchloe:—

W. King & Son	£395	0	0
Norris	380	0	0
Faulkner	375	0	0
Percy & Peabody	335	0	0
Stiling (accepted)	324	10	0

For the erection of a house, Westcombe Park, Blackheath, for Mr. T. W. Powell. Mr. Edward Robert Robson, architect:—

Higgs & Hill	£3,229	0	0
B. E. Nightingale	3,143	0	0
Kirk & Randall	2,990	0	0
Wm. Tongue	2,960	0	0
Atherton & Latta	2,950	0	0
Wall Brothers	2,895	0	0
S. J. Jerrard	2,843	0	0
Wm. Oldrey (accepted)	2,794	0	0

For alterations to the Upper Holloway Baptist Chapel, Holloway-road. Messrs. Searle, Son, & Hayes, architects:—

		Extra if Stone facings.
Southcott & Co.	£2,183	£110
Bamford	2,181	115
Goodman	2,075	85
Dove Bros.	2,015	90
J. Harper (accepted)	1,955	195

For mineral water factory, Holloway-road, for Messrs. Cooper & Co. Mr. G. Corfé, architect:—

Vears	£1,824	0	0
Cross	1,650	0	0
Macfarlane	1,498	0	0
Harper (accepted)	1,342	0	0

For new schools, Gifford street, Islington. Mr. W. Smith, architect:—

Larke & Son	£1,870	0	0
Dunford & Langham	1,689	0	0
Mattock Bros.	1,671	0	0
Harper	1,632	0	0
Shurmur	1,583	0	0
Cole & Chant	1,555	0	0
Stevens Bros.	1,548	0	0

For St. Matthew's Church, Brighton. Mr. John Norton, architect. Quantities supplied by Mr. S. J. Thacker:—

W. H. Webber	£12,250	0	0
G. Cheeseman & Co.	12,000	0	0
Goddard & Sons	11,131	0	0
H. J. Saunders	11,000	0	0
Stephens & Bastow, Bristol	10,999	0	0
Dove Bros.	10,995	0	0
E. Lawrence	10,795	0	0
Thos. Boyce	10,720	0	0
James Langley	10,690	0	0
Chappell (accepted)	10,473	0	0

For residence on the Stark's Hill Estate, Orpington, Kent, for Mr. B. W. Newton. Mr. G. St. Pierre Harris, architect. Quantities by Mr. C. Stanger:—

Crossley	£4,180	0	0
Sharpe & Mills	3,948	0	0
Taylor & Son	3,890	0	0
Grover	3,867	0	0
Haisman (accepted)	3,664	0	0

For residence on the St. Thomas's Hospital Estate, Orpington, Kent, for Mr. T. G. Wharton. Mr. G. St. Pierre Harris, architect:—

Pearse & Banyard (accepted)	£1,425	0	0

For drainage connexions to several properties at Orpington. Mr. G. St. Pierre Harris, surveyor:—
Davis & Attwood (accepted).

For new coachhouses to the Tiger's Head, and repairs to the "Laurel," Bromley, Kent, for Messrs. John Fox & Sons. Mr. G. St. Pierre Harris, architect:—
Grubb, Bromley (accepted).

For making a new road leading from Tottenham-lane, Hornsey. Mr. T. de Courcy Meade, surveyor:—

Jas. Pizzey	£998	0	0
Strachan & Co.	943	1	7½
F. A. Jackson & Sons	827	0	0
James Bloomfield	824	12	0
T. G. Dunmore	783	0	0
McKenzie, Williams, & Co. (accepted)	719	0	0
A. Walker	699	0	0

TO CORRESPONDENTS.

S. N.—I. T.—W. W.—A. S.—M. H.—J. T. J.—W. N. C.—C. J. P.—E. T.—H. S.—H. G. I.—Quæstor.—E. C.—E. & G.—W. H. M.—Constant Reader.—J. H.—J. S. F.—G. H. M. A.—One who Knows.—A Dean.—S. & E.—S. n.—W. C. T.—H. & R. P.—J. W. R.—J. s.—F. H. M.—H. H.—W. & Co.—H. & Co.—W. H.—W. V.—J. L.—B. & H.—M. & Co.—N. & R.—P. & P.—A. B. R.—H. R. M.—S. & R.—J. & A. B.—C. & Son.—G. St. P. H.—G. H. (before long).—D. & R. (next week).—W. C. T. (next week).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS.
Six lines (about fifty words) or under ..... 4s. 6d.
Each additional line (about ten words) ..... 0s. 6d.
Terms for series of Trade Advertisements, also for Special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c. may be obtained on application to the Publisher.

SITUATIONS WANTED.
FOUR Lines (about THIRTY words) or under ..... 2s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

REPLIES TO ADVERTISEMENTS,
Addressed Box ——, Office of "The Builder."
Cannot be forwarded, but must in all cases be *called for*, and the Office Receipt produced.

THE CHARGE FOR A BOX IS AS UNDER:—
For "Situations Wanted" Advertisements ..... 3d. per Week.
For all other Advertisements ..... 6d. per Week

PREPAYMENT IS ABSOLUTELY NECESSARY.

**** Stamps must not be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, King-street, Covent-garden, W.C. to

DOUGLAS FOURDRINIER, Publisher,
Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied *direct* from the Office to residents in any part of the United Kingdom at the rate of 18s. per annum, *prepaid*. Remittances payable to DOUGLAS FOURDRINIER, Publisher, 46, Catherine-street, W.C.

Best Bath Stone.
WESTWOOD GROUND,
Box Ground, Combe Down,
Corsham Down,
And Farleigh Down.
RANDELL, SAUNDERS, & CO., Limited,
Corsham, Wilts. [ADVT.

Box Ground Stone
Is the best for use in all exposed positions, being a well-known and tried weather stone.
50,000 feet cube in stock.
PICTOR & SONS,
Box, Wilts. [ADVT.

Doulting Freestone and Ham Hill Stone of best quality, in blocks, or prepared ready for fixing. An inspection of the Doulting Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone. Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK, Norton-sub-Hamdon, Ilminster, Somerset. — Agent, Mr. E. WILLIAMS, 73, Charlotte-street, Portland-place, W. [ADVT.

Doulting Stone and Ham Hill Stone, of best quality. Prices and Estimates, including delivery to any Station, on application to STAPLE & HANN, Quarrymen, Stoke-sub-Hamden, Ilminster. Agent, E. CRICKMAY, No. 4, Agar-street, London, W.C. [ADVT.

Asphalte.
Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.
Office:
No. 90, Cannon-street, E.C. [ADVT.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.

Immense quantities of
DRY WAINSCOT,
DRY MAHOGANY,
DRY WALNUT,
in all thicknesses.
B. J. HUDSON & SONS,
Whitfield-st., W., and Great Peter-st., S.W., London. [ADVT.

MICHELMORE & REAP,
Manufacturers of
CHARLES COLLINGE'S PATENT
COLLINGE'S PATENT HINGES, LEVER, SCREW, & BARREL BOLTS,
Self-Acting "FALL DOWN" GATE STOPS, and IMPROVED GATE FITTINGS of every Description.
36A, BOROUGH ROAD, LONDON, S.E.
Discount to Builders. Illustrated List two stamps.

Roofing Felts.—F. Braby & Co.

INODOROUS, SARKING, SHEATHING, AND HAIR FELTS, KEPT ALWAYS IN STOCK. MANUFACTURERS OF PERFORATED ZINC, PERFORATED COPPER, AND PERFORATED IRON, IN VARIOUS DESIGNS AND GAUGES.

Wrought Iron Tanks.—F. Braby & Co.

PAINTED AND GALVANISED, OF IMPROVED MANUFACTURE.

Corrugated Iron.—F. Braby & Co.

GALVANISED AND BLACK IN ALL GAUGES KEPT IN STOCK. ZINC WORK OF ALL KINDS.

FITZROY WORKS, 356 to 360, EUSTON ROAD, LONDON.

Hatton Garden, Liverpool; Great Clyde Street, Glasgow; and at Cyprus.